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MEDICINE AND THE MEDICAL AGE

A Monthly Journal of

Practical Therapeutics

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SURGICAL AND GENITO-URINARY THERAPEUTICS.

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ORIGINAL COMMUNICATIONS.

SOME GENERAL CONDITIONS BEARING ON TREATMENT OF SYPHILIS.

BY EDWARD MARTIN, M.D.,

Professor of Surgery in the University of Pennsylvania, Philadelphia.

Concerning the infecting organism of syphilis, neither its life history nor its place in a broad biological classification is definitely established. That it is vulnerable to desiccation, heat and many bactericidal substances is well recognized. That it is unable to penetrate an unbroken skin or mucous surface is commonly accepted.

Its method of transmission to the ovum is unknown. It is commonly believed that this transmission is from the mother, who must herself be infected before she can bear a syphilitic child; an argument, but not a convincing one in this direction, being based upon the circumstance that the spermatozoon is mechanically unable to harbor even a single spirochete. This concept entirely brushes aside, among others, the possibility of this organism undergoing changes of form in its life cycle.

It seems fairly well demonstrated that the drugs of greatest use in the treatment of syphilis do not depend for their efficacy upon their bactericidal qualities. It is known that under suitable culture conditions the microörganism may live in the laboratory for many years. It has been shown clinically that it does so habitually in the human; at times without clinical symptoms, at times with very definite and characteristic symptoms, and more often with symptoms which are not recognized as dependent upon an underlying syphilitic lesion.

It seems to have been shown that the seats of predilection in the human are vascular and perivascular, and that many, if not all, of the subjective and objective symptoms of the disease are due to this location and the reaction excited thereby.

Clinical histories prove that patients may become infected, even intelligent patients, and particularly doctors, without knowledge of a primary lesion or without trace of such having existed.

Except in hereditary syphilis, and that mysteriously acquired by a woman pregnant by a syphilitic man, the disease first manifests itself by a somewhat typical sore at the seat of primary invasion. Without any treatment this sore may heal and no further manifestations of the disease may appear through life. Usually this sore is followed in a definite period—*i.e.*, about six weeks—by the local and constitutional signs of systemic infection, which may be prevented by treatment.

Given a primary sore there is no assurance that an individual patient will ever be entirely rid of his infection, though under skilled care he will probably show no signs of this infection, and should he procreate will have clinically healthy children. Even when rationally treated there is no convincing evidence that syphilis in a large proportion of cases, or for that matter ever, is entirely eradicated. The only evidence to this effect being the increasingly large number of reported cases of reinfections, some of which are not convincing.

There is evidence to show that syphilitic infection under the best supervision materially shortens life and impairs function.

Though no symptoms develop which suggest the underlying nature of the devitalizing infection, there is accumulated evidence of the fact that from five to ten per cent of the population of this country are syphilitic.

Concerning the cure of syphilis, or rather its treatment, there are some apparently well-grounded beliefs. As in all infections, cure begins in prevention. It is probably the most preventable infection known, as it is probably the most general and badly treated. It is practically transmissible only in its early stages, to this rule there being some exceptions. It can be made non-transmissible in twenty-four hours by arsenical treatment, and can be so maintained. There are no laws by which a degenerate and contagious syphilitic can be forced, to his own large physical good, to become non-contagious. As soon as the people really wish it the disease can be brought strictly under the jurisdiction of the public sanitarians.

In the treatment of the disease the arsenicals, the mercurials, the iodides, and incidentally certain vegetable compounds, particularly those of sarsaparilla, are employed. Of these the first three are of certain value and are universally used.

The preparations of arsenic and mercury are particularly applicable in the early stages of the disease, during which period the iodides seem as a rule to be distinctly hurtful. By the arsenical preparations the patient may be rendered almost immediately non-contagious and his lesions to disappear with magical promptness. Mercury has not lost its vogue, and upon it many syphilographers still place their main dependence, supplementing it, and powerfully, by arsenic. Few, if any, depend upon the arsenic preparations alone. For manifest lesions both arsenic and mercury seem indicated at any stage of the disease. The rule of dosage is a comparatively simple one—*i.e.*, as much as the patient can take without affecting his health.

As to the method of use, the arsenical preparations are universally given intravenously. There is an impression favoring the value of salvarsan, under its various names, as compared to neosalvarsan. Because of its easier preparation and its apparently greater safety, incident to its more stable composition, neosalvarsan is largely used, usually in considerable concentration and by means of the ordinary glass hypodermic syringe, 10 or 15 Cc. of sterile water being regarded as a sufficient diluent for doses of .3, .6, or .9 gram. Small doses frequently repeated, at intervals of three to nine days, seem safer and more efficacious than large doses; a series of these, generally four to six, being followed by mercury. Arsenical preparations are somewhat unstable, subject to slight variations, and individual samples may be distinctly toxic.

The reactions which usually follow these injections are conspicuous by their absence, but occasionally such reactions occur, and there is little doubt that there are some fatalities which have not found their way into current literature.

It must be remembered that arsenic is a vascular poison and will manifest itself first upon the kidneys in the form of polyuria, but later in the form of suppression. Therefore an observation of the total quantity of urine is desirable in giving a series of injections, since the polyuria is a warning of what may follow from overdosage. Neither casts, blood, nor other pathological element will appear in the urine of the patient moderately overdosed with the arsenical preparation. Mercurials are given by hypodermic injection, by inunction, or by the mouth; sometimes by intravenous injection. The rate of absorption in all of these methods varies extremely, nor is one from this standpoint largely to be preferred to the other. The safest method is by inunction, the usual dose being a drachm a day for six days, with three days' rest; two, three, or four of

these courses being given in a series. Prolonged rubbing is not important; prolonged contact is. Perhaps the best technique is to instruct the patient to select various areas of the trunk, rubbing in a specific quantity at night for five minutes and putting on an undershirt, which protects his night garments. This undershirt is preserved and becomes of increasing value with the passing of time. The patient takes his customary bath in the morning and puts on clean clothing. For the hypodermics the soluble preparations are safer and more efficient than the insoluble ones. In either case the rate of absorption varies, but particularly so with the insoluble preparations, and at times these injections cause intolerable, indeed crippling, pain; nor is there any way of predicting when this will occur. The patient who has had a hundred injections without complaint may take to his bed for three days with the one hundred and first. Many patients do extremely well with mouth administration, which is wisely interrupted and, when possible, supplemented by inunction. Hydrarg. cum creta 1 to 2 grains three times a day, the protiodide of mercury one-quarter to half a grain three times a day, are perhaps the favorite drugs.

Mercury will demonstrate its toxic effects on the kidneys by salivation, by albuminuria, and by casts. It is an epithelial poison, hence the urine should be watched whilst the patient is under treatment with mercury. Clinically metallic taste, heavy breath and free salivary flow are early toxic symptoms.

The iodides, particularly the iodide of potassium, are given in the later stages of syphilis—*i.e.*, after one or two years—preferably in small doses, long continued and short of producing toxic symptoms. Occasionally in the presence of clinical symptoms, with or without a positive Wassermann, iodides in huge doses work miracles. Usually when thus given they greatly aggravate the miseries of the patient.

All antisyphilic drugs if efficient are so fairly promptly. Their long continuance without clinical betterment is inadvisable.

Concerning the duration of treatment it should be through life, until we have positive proof that our present intensive form of early therapeusis is sufficient.

Having treated these cases now for many years, the fewest number of late recurrences have been among those who spring and fall have with entire regularity taken fairly active treatment.

The most important single point in treatment is to recognize the fact that it is not the drug which cures the infection, but some alteration in metabolism accomplished by the drug; that this desirable alteration, to reach its maximum, depends largely upon the general bodily health, and that any drug which lowers vitality thereby defeats its object.

There are very definite indices as to health, and the most delicate and assured is psychic—*i.e.*, the patient's cheerfulness and capacity for sustained and concentrated effort, either mental or physical. Next comes the body weight, which should be maintained, unless it be excessive at the beginning of treatment. Next comes restful sleep, normal appetite and digestion, normal output from the kidneys. These indices should be carefully observed, since on them should be based the vigor of treatment. When they are lowered, even intermittently by treatment, the progress toward cure has been slowed; when progressively and continuously lowered the underlying infection has been stimulated indirectly by a lessened vital resistance.

EPITOME OF THE PRESENT TREATMENT OF SYPHILIS.

BY ALEXANDER RANDALL, M.A., M.D., PHILADELPHIA.

Scientific medicine of to-day studies a disease from four different points of view —that is, there are four unknown aspects of a malady that have to be solved before we can hope to control the disease. These four different points to be solved are (*a*) the causative agent; (*b*) the mode of transmission; (*c*) a means of absolute diagnosis; (*d*) and a specific therapeutic agent. A moment's retrospect will tell you that, though we have some of all these criteria worked out in almost every disease, there are few, if any, where the sum total is complete, and not until the truth has been established for each of these four problems can we truly feel we have that one disease under medical control.

Fifteen years ago syphilis was a disease uncontrolled and unknown, though probably no other had been so well studied, so well described, appreciated, and earnestly treated; and in spite of all it went on its way, untrammeled, unhindered, uncured—manifesting itself in a multiplicity of lesions and ways so protean that, as Osler truly said, "He that knows syphilis knows medicine."

There are estimates of recent date giving the number of syphilitics in this country alone as being 10,000,000. Vedder says 16 per cent of the adult working class, and 5 per cent of the college class. Church possibly puts it in another way by saying that one man in every five is syphilitic.

Appreciating some of these statements, if not all, in regard to one of the most prevalent and stubborn of diseases, what do we know to-day that we did not know fifteen years ago, and what can we do now that was impossible then?

In the first place our four criteria, essential for our proper knowledge and control of the disease, have all been fulfilled. The specific organism is now known and its transmission is understood; we have had given to us a test (Wassermann) whose specificity is no longer questioned; while from the point of view of therapy syphilis to-day stands alone, for we have not only one specific antidote, but two (really three) with which to combat its progress. One could hardly ask more, and yet even greater powers are ours. For the first time in the five centuries that syphilis has been recognized we are not only curing the disease, but in certain early stages this is being accomplished with only *one dose* of a medicinal agent. No other disease in medical knowledge stands in the same category with syphilis to-day—once the scourge of mankind, syphilis to-day is allowed to exist wholly dependent upon the wisdom with which we apply our powers of eradication and control.

How may they best be applied? First, as regards the various preparations now on the market: The German product salvarsan has been copied and produced commercially in France, Canada, and the United States. The American preparation is known as Arsenobenzol, the Canadian as Diarsenol, and the French as Arsenobenzol (Billon). They are all based on the original dosage of salvarsan—*i.e.*, the maximum dose in the adult male is placed at 0.6 gramme—and they all seem to be accurate copies of the German product. They are each one prepared for use in a similar way by *first* dissolving in sterile distilled water (or sterile normal salt solution) the powder in the ampoule, in which it forms a clear *acid* solution, unfit for intravenous administration until its reaction is changed; it is *next* precipitated by the addition of an alkali, sodium hydroxide, a slight excess of which causes a complete redissolving of the precipitate and a perfectly clear alkaline solution. Care should always be used at this stage that an excess of alkali above what is necessary is not added. Shaking always aids the dissolving. There are slight variations in technique according to which preparation is employed, but four general rules should be accentuated, viz.:

1. Follow the directions in the package implicitly.

2. Use it in large dilutions, 150 to 200 Cc.

3. Inject it only intravenously.

4. Use it *immediately* after preparing it; never have a druggist prepare it and send it around; fifteen minutes' standing may be put as the absolute limit of safety between preparation and use. This is because of the rapid change that the high arsenical percentage undergoes on exposure.

Neosalvarsan has been copied by the French, and is marketed under the name of Nov-arseno-benzol (Billon). These two preparations go immediately into solution in sterile distilled water, or sterile normal salt solution, and can be given as first dissolved as they form a proper alkaline solution. They are also soluble in small amounts of fluid and can be safely given by aid of a glass syringe made up in doses of 15 to 20 Cc. (or 0.15 of drug to 2 Cc. of fluid). The adult dose is placed at 0.9, and is supposed to be the equivalent in arsenic content of 0.6 of salvarsan. This solution should not be hot, but should be made up and given at room temperature, again following the intravenous administration and absolute freshness of preparation.

Dosage.—Let your dosage be governed by the following rules: It is always safe in judging dosage to be guided by the body weight of your patient. The maximum adult dose (0.6 of salvarsan and 0.9 of neosalvarsan) is based on a man of 150 pounds of body weight. Proportionately decrease this in smaller individuals; always make the first dose administered one size smaller than the full adult dose per weight, by either preparing a smaller dosage ampoule or by using only a portion of that prepared; and give to women consistently one size less than the relative dose per weight for man.

Frequency, time, and number of administrations depend upon the stage of the disease. The arsenic in the drug is totally eliminated by the third or fourth day after injection.

Primary Stage.—Our present ideas and teaching, backed by the ability of early diagnosis, run counter to all the sober dictates of our forefathers. They maintained, very properly, that before the stigma of syphilis was placed upon the remaining days of a patient the clinician must be certain of his diagnosis, beyond peradventure. This meant in their day that the appearance of the secondary skin manifestations must verify their suspicions as to the character of the initial lesion. This period of waiting was somewhat shortened with the advent of the Wassermann test, and the physician then waited until this became "positive," which usually occurs about the twelfth to the fourteenth day after the appearance of the initial sore. To-day we feel that the appearance of the positive blood test means that the localized infection is becoming, or has become, generalized, and we strive to arrive at an absolute diagnosis of the initial lesion during these few flitting days before general dissemination of the infection. This diagnosis is based on the character of the lesion and the finding of the specific Spirochæta pallida by the aid of the dark-field microscope. If treatment can be instituted at this time, it has been repeatedly demonstrated that the powerful arsenical preparations hold forth the possibility of a real abortion of the infection of syphilis, and the complete eradication of the disease before it has spread beyond the confines of nature's first efforts toward resistance.

There are undoubtedly cases in which in this period the disease has been completely cured by one injection of salvarsan, but it is not safe to trust to such a chance, and the advice of to-day is to give the patient at least four intravenous injections of salvarsan, or its imitation products, using it in preference to the neosalvarsan. This should be followed by mercury in some of its forms, for we must take advantage of the known specificity of this drug also. Personally I prefer the deep gluteal injections of the mercury salicylate put up in cacao-butter and in one-grain dosage. The salvarsan should be administered at intervals of five days. The mercury is started after the fourth injection of the salvarsan

and given at weekly intervals for the next three months at least. Wassermann tests should be consistently negative, and two years without treatment and repeated negative blood tests will warrant the conclusion that a cure has been established.

It should be remembered that a recurrence when such an infection has been aborted is the return of a chancre at the same point. These recurrences have undoubtedly been taken in the past as real reinfections, as the habits which produced the first are apt to be still present, and a recent exposure is supposed to account for a second infection. There are many such cases cited in the literature of to-day as exemplifying cure and reinfection, which ought properly to be classed as the recurrence of an incompletely cured local infection. The length of time that such a recrudescence may make its appearance may be several months after the disappearance of the primary sore.

Secondary Stage.—This should be considered to have started as soon as the Wassermann test is reported positive, which will be before the appearance of the skin eruption, for the "positive" test indicates that dissemination of the initial infection has started. The treatment of to-day is intensive saturation of the system first with the arsenic preparations, then with mercury, and keeping these two efficient specifics actively at work until the desired negative blood test is obtained, and even then making doubly sure by pushing the therapy for a few months after this end is accomplished.

Start by giving salvarsan at five- to seven-day intervals, or the neosalvarsan, for at least six doses; follow this by mercury inunctions every day for twenty-four doses. Wait ten days and then take a blood test. If this proves positive, start in and repeat your salvarsan and follow it by mercury again, the latter preferably by inunctions, or you may use the intramuscular injections at weekly intervals. A negative reaction once obtained should be held so by continuing the treatment by mercury for the following six months, when one may change to the other method of administration and give it by mouth. Wassermann tests at intervals of a month will be the guide, and on the slightest indication of a return to a positive reaction a repetition of the salvarsan administration is advisable. Some men feel that in order to play the game absolutely safe there should be a course of three injections of salvarsan or neosalvarsan, after a negative Wassermann test has been first obtained. I cannot but feel that were the question a personal one I would also desire the course of arsenic after the first negative reaction.

The question of the determination of when a cure has been established in the secondary stage becomes more difficult the longer the infection has been present. Again two years of repeatedly negative blood tests after the complete stoppage of all medication is the lowest limit of safety. The value of the so-called "provocative test" has been questioned. In all cases of secondary and tertiary syphilis one must appreciate the possibility of a focus of infection in the central nervous system, and a negative spinal fluid Wassermann test should also be demanded before the patient can be discharged.

Tertiary Stage.—Its variations are so manifold that rules of treatment are hardly advisable. In this stage there is, or should be, practically always a positive Wassermann test from the spinal fluid as well as the blood serum. One can comparatively easily obtain by treatment a negative blood reaction, but the spinal fluid must also be proven negative. The efforts of the investigators have been toward increasing the amount of arsenic or mercury that gets into the spinal fluid during administration in order to bring an increased amount of the therapeutic agent to the seat of disease, for apparently the choroid plexus does not allow the passage of great amounts of such drugs to enter the spinal fluid, or the spinal fluid itself changes so slowly that the opportunity is slight for such medicines to get there in any strength before the body eliminates the dose *in toto*. To circumvent

this the Swift-Ellis treatment of injecting intraspinally salvarsanized serum was started, followed later by Byrnes's method of mercurialized serum. A more rational and more easily applied method is that of Corbus, who gives the patient full doses of salvarsan every two days for five doses, and one hour after the fifth administration there is withdrawn 5 Cc. of spinal fluid by lumbar puncture. It has been demonstrated that by this means there is drawn through the choroid plexus a sudden influx of fluid in which is found a larger amount of the specific drug than one would dare to inject at one time by the intraspinal injection method. This course of treatment can be repeated in ten weeks' time, and an active mercurial medication is carried on in the meantime. One of the especially noticed benefits of the arsenical treatment of tertiary syphilis is the marked improvement in the psychical condition of these cases, and their mental uplift is most encouraging.

The establishment of a cure when the central nervous system has been involved must be looked at from two points of view. We feel that it is possible to halt the progress of the disease and in some cases to bring the infection to a complete standstill, possibly to overcome it entirely. But the second point is that when you have a destructive lesion of such a structure as the brain or the spinal cord, where every portion is essential to the performance of some function, it cannot be expected, nor do we see it, that a restitution of that tissue and function is accomplished. Ofttimes a patient with an advanced tabetic walk is so greatly improved that he can throw away his walking-stick, et cetera, but this improvement and return of function is probably due to the removal of edema, or inflammatory exudate, accentuating the trouble, rather than an actual healing of destroyed structures.

The effort should be made to obtain a negative blood and spinal fluid Wassermann test, and the patient ought to be very carefully followed by repeated examinations of the same, for here we see remissions more frequently than in any other form of involvement.

SOME CONSIDERATIONS ON THE MODERN TREATMENT OF SYPHILIS.

BY CHARLES W. BONNEY, M.D., PHILADELPHIA,
Demonstrator of Topographical and Applied Anatomy in the Jefferson Medical College.

The discovery of the spirochæta pallida and its recognition as the causative agent of syphilis, together with the elaboration of the powerful chemical spirillocide, salvarsan, have wrought many changes in the treatment of this disease. Not only do the changes thus brought about have to do with the administration of salvarsan and its congeners, but likewise concern the employment of the older remedy, mercury. Moreover, the discoveries have relegated to a position of lesser importance that time-honored remedy, potassium iodide.

One of the greatest blessings resulting from the discovery of the cause of syphilis is the more general acceptation of the idea that intensive treatment is essential in order successfully to combat the inroads of the disease. In other words, this means that the drugs which kill the spirochetes and overcome the tissue alterations which they produce must be given to the limit of toleration. Although such treatment has been used by specialists in Europe, and to some extent in Great Britain and this country also, for twenty-five years or more, its necessity was not generally appreciated until syphilis came to be universally recognized as a spirillosis. Prior to the year 1910 a form of therapy much in vogue was the so-called tonic treatment, which consisted in the administration of pills of protoiodide of mercury or gray powder by mouth, the patient being given these drugs in ascending doses until gastrointestinal disturbance or slight sensitiveness of the gums was produced, whereupon the dose which he was taking at that time was

reduced one-half and was then administered continuously for a period of two to three years.

Thus it was deemed feasible to effect a cure by a method mathematically accurate, easy of application, and devoid of any unpleasant accompaniments or consequences. With the advent of salvarsan, however, this complacency gave way to an enthusiasm for an energetic and rapid, not to say magical, subjugation of the disease; and despite the fact that the theory of a *sterilisatio magna* was abandoned by serologists and syphilographers almost as soon as its possibilities had been investigated, many doctors long continued to regard the new preparation as one by which syphilis could be promptly eradicated. Indeed, it was not uncommon for patients to remark that they would like to take an injection of the new medicine and be cured—so erroneous a conception of the potency of the drug had they obtained from statements made to them by their physicians. This misapprehension resulted in much harm. The prompt disappearance of superficial lesions, which so often follows the administration of one or two injections of salvarsan, was considered ample proof that the invading hosts of parasites had been vanquished. The evil heritage of such a fatuous supposition soon began to manifest itself, and patients with relapses of various kinds were plentiful enough in both clinic and consulting room.

Time, however, has brought about a better understanding of the value of the new remedy, its limitations, its methods of application, and its dangers. Naturally one's estimate of it will depend in part upon his own individual experience. At the present time, however, the consensus of opinion seems to be that salvarsan is a far more powerful spirillocide than mercury; that its action is more prompt; that it controls the clinical manifestations of syphilis more quickly than mercury; and that it reduces the blood reaction from positive to negative in a shorter period of time. That it, alone, suffices is not conceded by those whose experience best qualifies them to express an opinion.

If any hope is to be entertained of effecting a cure approaching the *sterilisatio magna* of early salvarsan days it can concern only those patients treated in the incipiency of their primary stage; for example, during the first week or two after the initial lesion has appeared. There is evidence to show that some patients so treated do not develop a positive Wassermann reaction; but it must not be forgotten that many of the statements in literature to this effect are made concerning patients who have been under observation for only a few months. While heartily in favor of an intensive salvarsan treatment in such cases, I cannot but feel that the best interests of the patient are safeguarded by following it with an equally intensive mercurial treatment. In my own practice a few patients subjected to this combined method have not shown a positive Wassermann reaction at any time; some have gone as long as three years and eight months without showing a positive reaction. In all of these cases the spirochetes were found in the initial lesion, so there was no doubt as to the correctness of the diagnosis. To affirm, however, that these patients are absolutely cured, I do not believe to be warranted. What the future may have in store for them no one can tell.

It is impossible to formulate a plan of treatment that can be applied to every case; but, as a working rule, it may be stated that an intravenous injection, consisting of 0.6 salvarsan or 0.9 neosalvarsan, should be given every week until four or five have been administered, provided, of course, that no bad effects are produced. Personally I prefer to give four or five full doses rather than a greater number of smaller ones. Such an intensive treatment I give only to patients who are in good general health. Naturally, age, physical condition, and personal habit act as modifiers of any system of therapy. My patients who took this intensive salvarsan treatment have, almost without exception, lost a few pounds

in weight, and one of them developed a mild neuritis of the lower extremities, the musculocutaneous and anterior tibial nerves being affected. Others had very sharp reactions after the third injection. The possible bad effects of such treatment should always be explained to the patient, and, moreover, the conduct of the treatment should always be governed by his reaction to the preceding injection. If the first injection is followed by a very severe reaction, another one should not be given for some time; and, in the event of alarming symptoms supervening, it would be prudent not to repeat the injection at all. It must never be forgotten that salvarsan and neosalvarsan may occasionally kill a patient.

Provided that four or five full doses at intervals of a week have been tolerated, a week or ten days' rest is given after the last injection and the patient is then put upon an intensive mercurial treatment, consisting of injections of biniodide of mercury in oil. For eleven years I have used for this purpose the French preparation known as cypridol, and find it satisfactory in every respect. I give the full contents of a 25-minim glass syringe every day until the limit of toleration is reached, making the injection in the gluteal region well away from the line of the sciatic nerve. A metallic taste, increased salivation, a sense of elongation of the front teeth, and slight sensitiveness of the gums will be the signs that enough has been given. Slight looseness of the bowels may be disregarded or, at the most, considered as only a prodrome of the other symptoms. After the latter have subsided, which will usually be within a few days, another course of injections is given, although, perhaps, the patient may not be able to take as many without developing signs of intolerance to the drug as he did during the first course. If for any reason he cannot come often enough for the injections of soluble mercury, an insoluble salt, such as the salicylate, may be given once every five to eight days. Of this salt, one and a half grains is none too large a dose.

This method of treatment with intervals of rest is continued until from 20 to 40 injections of cypridol have been given. After the lapse of two weeks or longer a Wassermann test is made; if positive, more salvarsan is given, followed again by mercurial injections. This process is repeated until a negative blood reaction has been obtained. In these early cases, however, it is not uncommon for the test to be negative after the first course of combined arsenical and mercurial treatment. If it is negative milder therapy is then employed. I have no fixed rule in regard to the latter. The important thing to do is to keep the patient under observation and have his blood examined every few months while he is taking treatment. It is my custom to give some mercury by mouth, even though the serological test shows the disease to be inactive. Of course, all patients are not treated exactly alike; experience, judgment, and common sense on the part of the physician will enable him to work out a plan well adapted to the requirements of the individual case.

If secondary symptoms have appeared before treatment is begun, both the clinical and serological control of the disease are more difficult matters; the spirochetes have been diffused throughout the system and have already wrought a multiplicity of tissue changes. Salvarsan should be administered immediately, but it is my opinion that greater caution is required in its use than during the primary stage. Experience leads me to believe that patients do not tolerate repeated doses as well as they do before they have become toxic as a result of their generalized syphilitic infection. Moreover, the destruction of large numbers of spirochetes and the casting of their poisonous products into the circulation may overtax the patient's power of elimination even to the extent of loading him up with a fatal dose of poison. The farther advanced the secondary stage, the greater are these dangers.

Further progress of the disease means a corresponding impairment of vitality. Especially cautious should we be with patients who are ill-nourished, cachectic, more or less alcoholized, and generally below par as to health. For these reasons I have no definite chronological system for the administration of the arsenicals during the secondary stage. I give a full dose, watch the patient's reaction, wait a week or ten days to see its effect upon the lesions, and then, if there is no contraindication, give another full injection. Frequently the second injection is followed after the lapse of a week by daily intramuscular injections of mercury until the physiological action of the latter drug fully manifests itself. Then after the subsidence of these effects another injection of salvarsan or neosalvarsan is given. In some cases more than two doses of the arsenical are given before any mercury is administered, but I am so convinced of the necessity for the latter drug that I like to combine it with the salvarsan almost from the beginning of the treatment, using the two alternately until the lesions have disappeared and the blood reaction has become negative.

It is the custom of some thoroughly experienced physicians to give the arsenicals and mercurials simultaneously. I prefer, however, to use them alternately in the manner just described. In this way, by giving repeated courses of both drugs during the first few months, all active signs of the disease are controlled, its contagiousness is destroyed or very much lessened, and its progress is materially arrested. It is necessary, however, that after this treatment be continued for a period of three or more years, according to the exigencies of the case. Liberal doses of mercury by mouth can be relied upon during part of this period. I prefer the biniodide, of which the average patient can take from two-thirds of a grain to one grain a day without any disturbance. In text-books schemes for the administration of mercury by mouth are described; for example, a certain number of days during the first six months, a certain number during the following three months, and so on. I have not found such plans at all satisfactory, and am governed by the indications in the individual case. For patients who come under treatment with well-advanced secondaries I also employ iodine in conjunction with the internal mercurial treatment, or even simultaneously with the injections, giving it either in the form of one of the chemical salts, or as an organic compound, such as iodalbin. Here, too, the rule is to give enough to produce signs of intolerance and then to stop for a while. It is given for the purpose of causing resolution of any tissue deposits that may have been formed. Throughout the three years' treatment it is well to give a few mercurial injections from time to time, and, if the Wassermann becomes positive or if recurrence has taken place, two or three intravenous injections of salvarsan or neosalvarsan should be given.

This is the way in which I am treating syphilis at present. In my hands the method has given satisfactory results. Of course, in certain cases conditions will arise which will make it advisable to deviate somewhat from the scheme herein outlined. As a control it may be well in some cases to have the reaction of the spinal fluid tested after the blood reaction has been repeatedly negative. This will necessitate a day's rest in bed, preferably in a hospital.

If it be borne in mind that in the treatment of syphilis the great desideratum is to hit the disease hard early in its evolution, at the same time realizing the potential danger of intensive arsenical treatment and exercising judgment in its application, excellent results can be obtained. The new remedy should in nowise discount the value of the older one, mercury, which should be given in liberal doses. The treatment of late syphilis, while presenting many problems of interest, does not come within the scope of this paper, and consequently will not be discussed.

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THE SMALL VOLUME METHOD OF ADMINISTERING NEOSALVARSAN, ETC.

BY S. W. MOORHEAD, M.D.,
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The advantages of giving the arsenical preparations used in the treatment of syphilis in a small bulk rather than in the comparatively high dilutions formerly recommended are, from a theoretical standpoint, the lessened quantity of fluid added to the content of the cardiovascular system and a reduction in the impurities injected should there be, in spite of every precaution, a fault in the water used for the solution of the drug. From a practical standpoint the advantages are a lessening in the toxic effects of the medication, patients greatly preferring the syringe to the burette method, a reduction in the size of the needle which may be conveniently used, and greater ease of administration, the apparatus being less bulky and more easily handled.

The alleged disadvantage of the method, that the dosage is injurious when suddenly thrown into the system in a highly concentrated form, whereas it is easily borne if given well diluted and slowly, would certainly hold were the medicine injected rapidly; but given slowly, taking the precautions detailed below, the blood acts as a diluent as it flows past the point of the needle, so that so far as its contact with the body tissues is concerned, the preparation is little, if any, more concentrated than when given in large bulk, nor is its effect more sudden.

The apparatus required is a graduated mixing cylinder of 25 to 50 Cc. capacity, a receptacle into which the solution of the drug may be poured before filling the syringe, a syringe (all glass) of 10- or 20-Cc. capacity, a 22-gauge needle, and a tourniquet; and when an acid preparation is to be administered, sodium hydrate solution, a medicine dropper, a small funnel, and sterile cotton. All of the instruments should be boiled in clear water immediately before use.

When neosalvarsan is to be given a 10-Cc syringe is sufficiently large; for salvarsan, diarsenol, and arsenobenzol (Polyclinic) one holding 20 Cc. is to be preferred; the drug can then be dissolved in 10 Cc. freshly distilled water, neutralized, filtered through cotton, and the filter washed through with another 10 Cc. of water. Needles should be of some non-corrosive material (platinum, gold, "nickeloid"), and should be carefully ground. As a receptacle for the solution a three-and-a-half-inch "watch crystal" or a small beaker answers well. A strip of rubber dam, twelve inches long and three inches wide, makes the best tourniquet. It is tightly passed once about the arm, and fastened by tucking under a loop of one of the ends, somewhat as a sheaf of grain is secured.

The syringe being loaded, needle attached and air expelled, the tourniquet having been applied so that the maximum distention of the veins is obtained, and a watch laid on the table beside the patient's elbow, the needle is inserted into the vein, its entrance being announced by the appearance of blood in the syringe in the majority of cases; when due to the tightness of the piston in the barrel this does not occur, a gentle pull on the piston will reveal the position of the point of the needle by the appearance or non-appearance of blood. It is needless to emphasize the fact that the injection of even a few drops of the concentrated arsenical solution into the subcutaneous tissues may give rise to severe irritation. The tourniquet is removed by a gentle pull on the tucked-in end as soon as blood is seen in the syringe.

The injection is made at the rate of one cubic centimeter in twenty seconds. It may be safe to adopt a greater speed than this, but this rate has proved so satisfactory that no experiments to determine this point have been made. By resting the fingers of the left hand firmly on the patient's forearm the syringe may be held quite still; no difficulty has been experienced in keeping the needle in the vein during the injection.

After the injection is completed a little blood is drawn into the syringe to avoid the danger of leaving any of the drug in the tract of the needle as it is removed.

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THE PROVOCATIVE WASSERMANN TEST IN THE CLINICAL DIAGNOSIS OF SYPHILIS.

In the *American Journal of Syphilis* for July, 1917, Stokes and O'Leary reach these conclusions:

1. From a study of 103 cases in which an injection of salvarsan was given to provoke a positive Wassermann after a negative test, presumptive, but not conclusive, evidence of the existence of a provocative effect was obtained.

2. A knowledge of the tendencies and limitations of the Wassermann technique employed should form a part of any study of the clinical value and interpretation of the provocative Wassermann test.

3. Such a study on a series of repeated Wassermann tests in the Mayo Clinic seemed to indicate that the tendency of the technique was conservative and against the conversion of negative into positive reaction without the administration of salvarsan.

4. It seems probable that both individual technical variations and variations in the reagents are a factor in the results in addition to the provocative effect.

5. Positive provocative effects were obtained in 18.4 per cent of 103 cases.

6. The provocative test was of value in recognizing as insufficiently treated two out of six cases (33.3 per cent) in which it was applied to determine whether a cure had been attained.

7. A strictly controlled and completely worked-out provocative procedure involves an amount of labor which makes it clinically inapplicable, and it seems probable that this same obstacle will keep it in the field of presumptive rather than conclusively demonstrated clinical phenomena for some time to come.

8. The provocative test in Stokes and O'Leary's series seemed to be of the least service in active deep-seated visceral, osseous, and central nervous system syphilis, where it was most needed, fairly efficient (40 per cent) in latent syphilis, and most often positive in late cutaneous and mucous membrane manifestations, where the diagnosis can often be made morphologically.

9. Their results do not suggest that the provocative is entirely a Herxheimer reaction phenomenon, since local and symptomatic Herxheimer reactions occurred in their series in cases in which no provocative effect could be recognized, as well as in cases showing a provocative effect. It is possible, however, that the use of several very sensitive antigens might demonstrate an effect not detected in routine procedure.

10. A suggested procedure for provocative tests is given and seems to them to represent a compromise between the clinical impossibility of a fully controlled procedure, on the one hand, and partial and untrustworthy methods on the other. At its best the test yields a rather small return for the amount of trouble, and if overelaborate is subject to the same risk of error as the oversensitive Wassermann test.

11. Certain special indications for the provocative procedure are enumerated.

12. The percentage of cases whose syphilis was suspected from clinical examination ran parallel to the percentage shown to be syphilitic by therapeutic test, and far in advance of the number shown to be syphilitic by the provocative test.

13. The therapeutic test, properly applied to suitable cases, would seem to be of more value in clinical diagnosis of obscure syphilis than the provocative Wassermann test.

14. Positive therapeutic effects were obtained in 63.1 per cent of thirty-eight cases and in 65.2 per cent of twenty-three cases in which the provocative test had failed to establish the presence of syphilis.

15. The provocative Wassermann would seem to be of little value in the absence of clinical evidence of the disease, and to be inferior both to clinical judgment and the therapeutic test in the recognition of obscure cases.

EDITORIAL.

DIRECT TRANSFUSION OF BLOOD.

Although direct or indirect transfusion of blood was resorted to comparatively early in the history of modern medicine, nevertheless it did not gain favor, probably because in a certain number of cases the blood of the donor produced hemolysis in the blood of the donee, and at that time hemolysis was not recognized and methods of determining that it would occur in a given donee had not been developed. With the advances which have been made in our knowledge of the blood it can easily be determined beforehand whether the blood of the donor will agree with the blood of the donee, and thereby transfusion has been changed from being a haphazard or dangerous procedure into one which is often exceedingly valuable and very rarely followed by disagreeable results. One of the other difficulties which has stood in the way of its being resorted to frequently has been the belief that certain complicated forms of apparatus and cannulas had to be employed, but increasing practice and experience is constantly simplifying these methods of procedure. We have, on the one hand, the employment of citrated blood, which is an indirect method not to be discussed in this article, and the direct transfusion by means of tubes. Some of these tubes have been difficult to handle and require great dexterity in their use. The employment of a paraffin coating to prevent coagulation of blood has done much to render the method possible.

Not only is direct transfusion of the greatest possible use in many cases of hemorrhage and in secondary anemia, due to sepsis or intestinal parasitism, but it is also useful in combating shock, particularly if shock is associated with hemorrhage, as after severe wounds and injuries. Fullerton, an English surgeon, Dreyer, Professor of Pathology in the University of Oxford, and Bazett, Captain, Royal Army Medical Corps, discussed this matter in an article contributed to the London *Lancet* of May 12, 1917. They insist upon its value when all methods of resuscitation have threatened to fail, and state that they have seen patients who were blanched and shocked brought back to life in a most astonishing way. They recognize that it has its limitations and do not recommend its indiscriminate use. They point out that after a rapid and moderately severe hemorrhage, the main indication is to administer fluid, and that this can quite readily be accomplished by the introduction of saline solution into the circulation. If the hemorrhage has been very severe, or recurrent, so that the hemoglobin content of the blood is at a level insufficient to maintain life—for example, in the neighborhood of twenty per cent—transfusion is imperatively indicated, and even if it is as high as thirty per cent it is still indicated. A percentage of forty appears to be sufficient to carry on full oxidation in a patient at rest, but if there is accompanying sepsis undermining vitality then in such a case transfusion may be advantageous. These writers, while recognizing the importance of excluding syphilis and other infectious diseases in the case of the donor, state that they have not considered it necessary to examine the compatibility of the donor's blood with that of the donee. This seems to us to be taking a risk which is unnecessary, but they add that in sepsis hemolysis and agglutination often take place, and therefore the test may be unreliable. They quote American writers as expressing the view that the risks of a fatal result from transfusion do not exceed one or two per cent, even if the donor is not related to the recipient.

The method which they employ consists in two glass or silver cannulæ, connected by a short length of about seven inches of india-rubber tubing, the whole being coated within and without by a thin layer of wax made by mixing hard and soft paraffin. They use thin-walled, transparent india-rubber tubing which will stand heat and

which will allow pulsations to be easily felt. The paraffin mixture consists in about equal parts of hard and soft paraffin, or in such parts or proportions as to set at a temperature of forty-three to forty-eight degrees centigrade, the optimum being about forty-five degrees. This mixture may be used again and again, as may the rubber tubing, but usually it is best to employ fresh tubing. The coating is effected by immersing the apparatus in the paraffin mixture in a water-bath at a temperature of 130 degrees centigrade, which also sterilizes the instrument. Care is taken to see that the cannula and tubes are filled with the mixture without air bubbles. They are then held in a vertical position so that the fluid is allowed to run out of the larger cannula, which will ultimately be inserted in a vein, and the last drops are removed by drawing the end of the dependent cannula lightly across sterile gauze. The coating is allowed to set, and then placed in a sterile wrapping ready for use in a sterile test-tube carefully plugged. Each cannula should have a shoulder in order that when introduced into a vessel it may be held there by ligation, and each cannula should have a bevel point. The donor and donee being placed side by side, the smaller cannula is inserted into the radial artery, and the larger cannula, with its connecting tube, into one of the veins of the elbow. It is best for two operators to perform the operation, one exposing the vein and the other the artery. Before the vessels are opened hemorrhage should be prevented by means of light bulldog forceps. The tubes being in place the forceps on the artery are released for a moment to allow the apparatus to fill with blood to expel air; the forceps are then replaced on the artery and the vein cannula introduced and tied in place. Both forceps are then removed and the blood allowed to flow, when pulsation can be readily felt in the tube. The quantity of blood varied from 600 to 1000 Cc.—that is, approximately from a pint to a quart. If the donor feels faint the operation should be stopped. The symptoms in the donee that call for a cessation of transfusion are chill, precordial pain, increase in pulse-rate, and failure to improve in color.

The obvious disadvantage of the method we have just described is that the authors recommend, and we do not see how it can be avoided, the ligation of the artery and the vein after the operation to prevent hemorrhage. This, of course, cuts out an important vascular supply and to some extent interferes with the repetition of the transfusion if it is needed.

This method of direct transfusion seems to be about as simple and efficient as any yet devised and ought to be readily accomplished by any one who has done vascular work. From personal experience we would recommend that care be taken in the drawing of the glass cannulæ that the glass is properly annealed or tempered. In heating the ends of the glass tubes for the purpose of shaping them the glass is often made exceedingly brittle and fragile and breaks when exposed to heat or on light handling. If it breaks when in the blood-vessel it greatly complicates the operation, as the particle has to be removed and the endothelial lining of the vessel is injured, whereby clotting readily occurs. The writers we quote, in their article, give records of sixteen cases, and conclude that it is a most favorable measure.

ON METHODS OF ADMINISTERING ANTITETANIC SERUM.

We confess that we had thought this question had been pretty well determined until we read in the London *Lancet* of May 5, 1917, a series of articles upon this important subject. The first of these is a report on twenty-five cases of tetanus made by Dean. In this report it is stated that the majority of the patients had been wounded in France, and that it is probable that almost all, if not all, had received prophylactic injections before leaving that country. In all instances the wound had been at one time or another septic, but in nine of the cases it had healed or practically

healed at the time of onset. In thirteen cases the wounds had been of a severe nature, causing considerable laceration; in four they were quite superficial; in one case tetanus followed in two weeks after amputation of what appeared to be a perfectly clean stump. In other words, five of the twenty-five cases of wounds were of such a nature that it is improbable that the most conscientious medical officer would have selected these men for further prophylactic injections. It is evident that the administration of prophylactic injections to every wounded soldier after his arrival will materially diminish incidence of the disease. Dean also points out that of greater value as an indication for the administration of prophylactic injection than the mere extent of the wound or the amount of the discharge is the presence of a foreign body or the existence of a compound fracture. There was a compound fracture in eleven of the twenty-five cases referred to, in two a leg had been amputated, and in seven there was a history of removal of a bullet or fragment of shell. In at least two cases the foreign body was still in the tissues at the time of the onset of tetanus.

When prophylactic doses of tetanus antitoxin failed to prevent the disease, nevertheless they profoundly altered its course. Thus, in the twenty-five cases referred to the incubation period from the original date of the wound exceeded fifty days, and in only two cases did signs of tetanus develop within ten days of the date of the operation. In other words, prophylactic doses caused marked prolongation of the incubation period. Such doses prolong the rate of onset so that it is continued over a period of days or even weeks. And this is advantageous in that it permits the disease to be recognized and actively treated before it becomes severe. On the other hand, the very slowness of development is in itself insidious and may puzzle the physician.

In ordinary cases the muscles most frequently involved appear to be the masseters, the posterior cervical muscles, the muscles of the anterior abdominal wall, the spinal muscles, those of the lumbar region, and the flexors of the hip, knee, and ankle. Out of the twenty-five cases referred to by Dean, in four the spasm remained localized in the neighborhood of the wound, in ten it commenced in the neighborhood of the wound and gradually produced general involvement, in eleven there was no history of preliminary local spasm and the disease commenced suddenly by involvement of the jaw and neck muscles.

Dean gives careful consideration to the results obtained by different methods of injection. He thinks that in very mild cases intramuscular injections are quite sufficient, using 10,000 units, followed at three-day intervals by a second and third dose of 5000 units. When the cases are severe, however, intravenous injections are much to be preferred, 30,000 units, varying in bulk from 120 to 190 Cc., being given intravenously. Intraspinal injections were also used in severe cases, supplemented by intravenous and intramuscular injections. Dean does not think that it is necessary to give injections at frequent intervals until every sign of tetanus has disappeared. He warns against a diagnosis of rheumatism or muscular rheumatism being made in the early stages.

Dean's statistics show that of five mild cases treated by intramuscular injections five recovered; that of fourteen treated by intravenous injections thirteen recovered; and that of five treated by intraspinal injections three recovered. But this does not mean that the intraspinal method is feeble, but rather that the conditions met were more desperate.

In another paper upon this subject contributed by Sir David Bruce to the same journal of the same date, upon "Intramuscular versus Intraspinal Injections," he strongly insists upon the manifest superiority of the spinal route over the muscular route. According to his experiments, which were made upon animals, out of twelve animals treated intramuscularly all died, but of eighteen animals treated intraspinally thirteen recovered.

In still a third paper by Andrewes, he says, in concluding his communication, that his object in writing has been to confirm the faith of those who believe in the intraspinal route in face of doubts which have recently been cast upon its value. He believes that the risks are less and the prospects of cure greater when the intraspinal route is chosen in preference to the intravenous route, and that the loss of time suffered in the absorption of the antitoxin when it is administered intramuscularly is a loss of precious time which may cause the loss of a life.

Then we have another paper by Golla, in which he makes reports of experiments upon animals to determine this question. He emphasizes the fact that the War Office Committee for the Study of Tetanus has insisted upon the advantage of intraspinal treatment, and states that his experiments upon animals show the indubitable superiority of the intravenous and the intraspinal routes over the subcutaneous.

Finally, Gow reports a case of tetanus treated by combined intraspinal and intramuscular injections, but noteworthy in that injections were made high up in the dorsal region because the arm was the principal site of spasm. Five thousand units were injected in the lumbar region at first, and 10,000 were given intramuscularly. Seven hours later the patient was worse, and on the next day an injection of 4500 units was made between the first and second dorsal vertebræ, a similar quantity of cerebrospinal fluid being first withdrawn. It is interesting to note that this spinal fluid was found to contain some of the antitoxin injected on the previous day. On each succeeding day for five or six days 5000 units were injected intramuscularly. On the sixth day of the injection, a second injection between the first and second dorsal vertebræ was given. The patient then rapidly recovered.

From all of which it would appear that, face to face with tetanus, it is probably wise to give it intraspinally, intravenously, and intramuscularly, and to rely upon intraspinal injections in direct proportion to the severity of the symptoms.

If it be true that tetanus toxin travels along the axis-cylinder of the nerve from the infected point, early intraperineural injections would also seem wise.

In collecting statistics in regard to the efficiency of any method of treating tetanus, it is not to be forgotten that these cases are divisible into practically three classes: Fulminant cases in which the patient dies within a few hours, even if every avenue of entrance for antitoxin is utilized; moderate cases in which the antitoxin will save a large proportion; and the chronic cases, of which a fairly large percentage recover even without antitoxin. The latter type of case may cause statistics which seem to possess value to contain a large factor of error.

THE CALCIUM CONTENT OF THE BLOOD.

We have again and again pointed out in these pages that there is no tissue of the body in which nature maintains so constant a composition as that of the blood. The introduction into it of any foreign substance at once calls into activity various methods of elimination, or destruction, which are utilized in an effort to get rid of it, and even when substances which are normally present in the blood are introduced in quantities in excess of those which are usually present, again every effort seems to be made by the body to immediately establish a normal tonicity or quantity. If any of the usual salts of the blood are injected into the blood-vessels, either the kidneys get rid of the excess material, or the blood draws from the fluids of the body a sufficient amount of liquid to dilute the injected salts so that their concentration is physiological. If anything is done which interferes with either of these processes, salts, which ordinarily are present and innocuous, immediately become poisonous. This is well illustrated if the potassium salts are taken when the function

of the kidneys is impaired. A man with healthy kidneys can take large quantities of potassium salts with impunity, but if his kidneys cannot promptly eliminate the potassium salts symptoms of poisoning from these salts soon appear.

In this connection we find of interest a communication which has recently been published by Halverson, Mohler, and Bergeim upon "The Calcium Content of the Blood." Other investigations have shown that the calcium content is remarkably constant. The investigators whom we quote studied the blood of human beings in different stages of pulmonary tuberculosis, and have reached identical results, finding that even when a diet rich in calcium is administered the calcium content of the blood, both in the sick and in the well, ranges between 9 and 11 milligrammes per cent., the amount usually found, however, being 10.5 milligrammes per cent. Even in conditions when the kidneys are diseased, and uremia is present, it has been shown by Lyman that the calcium is not increased, and, notwithstanding the theories which were advanced some years ago, chiefly by Wright, that in hemophilia and purpura the calcium salts would prove useful therapeutic agents in that they would overcome the paucity of this substance in the blood, it would appear that in these diseases there is not a real paucity, although the amount of calcium may be about 75 per cent of that which Halverson, Mohler, and Bergeim found to be present. It is pointed out by these three investigators that a man weighing about 150 pounds has in the total volume of his blood only about 0.3 of calcium, although the bones contain four thousand times this quantity. From this great reservoir of calcium the system, therefore, should be able at all times to obtain the infinitesimal amounts which are necessary to maintain the normal calcium content of the blood. This probably accounts for the constancy of content which had been found, and raises a grave doubt as to whether the administration of calcium salts by the mouth or hypodermically is of much value. Such a doubt has been raised by clinicians who, following Wright, have employed the calcium salts in cases in which the coagulation time of the blood was materially prolonged. To such an extent is this true that we think it may be fairly stated that whereas a few years ago, subsequent to the publication of Wright's papers, calcium chloride or lactate was often given, recently such a plan of treatment has almost dropped out of sight. Possibly the discovery on the part of clinicians that they did no good is explained by the results of Halverson, Mohler, and Bergeim.

THE CARE OF VENEREAL DISEASES IN THE ARMY.

Based on the experience of all wars, to which this one may be no exception, a major cause of individual crippling has been from venereal diseases, usually temporary, occasionally permanent. Against the large incidence of this a well-organized campaign has been formulated, based on, first, instruction as to the dangers incident to contraction of these diseases; second, on recreation, by which the soldier's leisure time may be pleasantly occupied; third, on hygienic supervision of the regions environing the great cantonments, by means of which promiscuous sexual approach may be rendered difficult or impossible and sources of infection when discovered may be removed.

None of these measures will prove largely efficient unless the health authorities take this opportunity for inaugurating that campaign against syphilis and gonorrhea for want of which these diseases remain unchecked. If in every State of the Union syphilis and gonorrhea are made reportable diseases, and if the rights of the individual suffering from either or both are as completely disregarded as they would be in case they were infected by scarlet fever, the first real step toward eradication will have been made. This implies not merely reporting and supervision, but provision for sequestration of infected foci.

The army discipline is such that it is difficult, indeed well-nigh impossible, providing regulations for examination are efficiently carried out, for a man venereally infected to conceal it. If each infected man names the source of his infection, and if this source is promptly supervised or taken in charge, it is obvious that an infected female, or indeed any female, will be as loath to confer upon the soldier her favor as is the barkeeper of to-day to give him a drink while in uniform.

Nor would such measures excite large opposition, nor has the time ever been more ripe for them than at present.

Since courage may be lacking to even attempt this very large sanitary reform there must be provision, and very large provision, made for the treatment and prompt return to duty of the venereally infected soldier. Indeed, it is well recognized that the establishment of venereal units of a general hospital will be needful, nor is the method of procedure at the General Hospital of Alexandria (*Journal of the Royal Army Medical Corps,* July, 1917) without its useful lessons.

As to the staff, one medical officer is detailed for every hundred patients, with about six orderlies, including cooks, clerks, pack store, linen store, and sanitary men. Moreover, six laborers are employed for the most disagreeable part of the work. There is a building divided into two parts containing the latrines, ablution benches, and baths; one patronized by the syphilitics, the other by those suffering from gonorrhea. The wash is done in the general laundry, and the clothing is all steam-sterilized before being sent to be washed. The Red Cross provides a recreation hut, and all dressings are done in dressing-rooms. It is noted that because of instruction in the subject men apply very early for treatment. The syphilis diagnosis is made by the microscope; where antiseptics have been applied to the wound a simple dressing is put on for a week, and the microscope is then used. Later the Wassermann test is relied on. Gonococci of course are identified at once. Most of the cases are recurrent ones.

The dressing of the chancre is a simple mercurial one. The patient is given an antiseptic tooth powder, instructed how to use it, and general treatment by salvarsan and mercury. In early cases two doses of salvarsan (each 0.1 gramme) are given with an interval of at least fourteen days between them. In the secondary stage three doses are given. Patients unfit for full dose are given smaller ones, the total quantity being about the same. Before giving salvarsan the patient is purged the night before, and put on milk diet for twelve hours before and twenty-four hours after the injection. The solution is prepared as usual, 250 cubic centimeters being given. After the injection the patient is kept in bed until the following morning. Some cases of rising temperature with vomiting and diarrhea are recorded, and some of erythema and urticarial lesions.

In addition the patients are given 9 grains of mercury intramuscularly, either as six weekly injections of 1½ grains or nine weekly injections of 1 grain, or a mixture of these doses according to the weight of the patient and the tolerance he shows for the drug. Gray oil is employed, the injection being made deep into the upper part of the gluteal muscles. In some cases gingivitis followed this treatment, and in some slight nephritis. Cardiac dilatation with marked tachycardia in two cases was so pronounced as to be distinctly dangerous. The condition in both cases came on suddenly, and in neither case could other signs of mercurialism be detected. Some complained of headache and fever after injection of one grain. Inunctions were therefore used in these cases.

As soon as a man has had two salvarsan injections and three injections of mercury he is discharged from the hospital for light duty, returning to camp every Friday morning for treatment until the completion of his course of mercury. The medical officer always looks at the mouths and excuses

those who are salivated. He examines all the urines, admitting those with albumen.

As to gonorrhea, the men are kept in bed on a milk diet during the acute stage, then get up with ordinary diet which contains meat. Drugs are not much used. All patients are irrigated from the day of admission one to three times daily, according to necessity, 1:10,000 potassium permanganate being employed warm. Each patient is trained to do his own irrigating. An irrigating room containing eighteen stalls, each of which is fitted up with an ordinary douche-can hanging six feet six inches from the ground, rubber tubing with stopcock, a water-proof apron, and a small wooden stool are provided. The patients are paraded outside the room. Eighteen men go in and each takes a douche-can from a stall. Each fills this with warm water, and then goes to the orderly, who puts in the requisite amount of potassium permanganate, and hands to the patient a sterilized nozzle. The patient takes it out to the stall, fills up the douche-can and irrigates. When he finishes he detaches the nozzle from the rubber tubing and hands it to the orderly for sterilization. He then gets a urethral injection of mixed zinc sulphate or other astringent or antiseptic, according to the state of his disease and the fancy of his medical officer. Men who fail to attend for irrigation are punished. Prostatic massage is carried out in cases suffering from subacute or chronic posterior urethritis. It is highly spoken of. Obstinate subacute and chronic cases are treated with vaccines.

As to the test of cure, the patient who has been free from discharge for two days is ordered to hold his morning urine till the medical officer, or the assistant ward master, sends for him to pass it in the urine testing room. If the urine is free from threads or "floaters" he is ordered to repeat this in two days. If this second specimen is satisfactory he is discharged. If the first specimen is not free from threads he is put back on treatment for a few days, and if still free from discharge has another attempt to pass what he calls a "water test." Cases of gleet who suffer from an early morning bead are treated with irrigations, massage, vaccines, etc., but, if the case is one of long standing, they do not insist on a cessation of discharge as a proof of clinical cure. These patients have their prostates vigorously massaged and a smear made of the resulting secretions. If no gonococci are found the patient is sent out to duty.

As to soft chancres, the best results are obtained by ionizing the sore with 1:1000 bichloride solution, and if it is indolent, stimulating it with ten grains zinc sulphate solution to the ounce.

The average period in the hospital is 39 days for syphilis, 34 days for gonorrhea, 30 days for soft chancre.

This contribution represents a practical organization, probably very similar to that which will be adopted by our own medical officers. Concerning the remedies used in syphilis there will be no difference. There may be a distinct variation, however, as to the dosage and intervals between doses. As to the method of procedure to be adopted in the case of gonorrhea, its possible variants are so great that speculation is likely to be fruitless.

A vigorous national and international policy would so diminish the number of cases as to make many special hospitals unnecessary.

TREATMENT OF WOUNDS OF THE KNEE IN WAR.

The enormous experience of this war should by this time have definitely indicated the line of treatment which is most serviceable and helpful in all lacerated and contused and infected wounds. In the minds of some observers, but by no means all, this end has been accomplished, and the Carrel-Dakin treatment has been that which has saved more lives and limbs and lessened mutilation more markedly than any other surgical procedure. Perhaps no treatment could have a more crucial trial than that

incident to wounds involving the knee-joint, concerning which and their management surgeons even before the war were by no means in accord. In the beginning of the present war Berard (*Revue de Chirurgie*, November and December, 1916, published in June, 1917) notes that the semi-official directions concerning wounds of the knee were to the effect that they should be treated conservatively. The first dressing having been applied and the part immobilized the patient should be sent to the rear, where operation should be performed only in cases of virulent infection.

This teaching doubtless was based in part upon previous military experience in which bullet wounds formed 90 per cent of cases as opposed to the 10 or 15 per cent of such wounds in the present war. Moreover, it is probable that many of these wounded patients were not carefully followed up, and final provisions were not made for thorough surgical treatment. Berard states that even at the beginning of the war he and his colleagues practiced large and early arthrotomies and methodical resections when the knee-joint was heavily infected, followed by immobilization. When these formal surgical procedures were practiced promptly before the infection was wide-spread, the devitalized tissues being cut away and the foreign bodies removed, the results were so much better following such prompt surgical procedure than when infections were well established, and this not only in regard to the knee, but concerning all infected wounds, that all armies now fighting at the front have made provision for this prompt surgical service and as near the firing line as is practicable.

In 1915 Delore with Kocher advocated cleansing the synovial cavity of the joint with ether or artificial serum, curettage of cartilaginous and osseous erosions, and closure of the synovial cavity without drainage, excluding as far as this was possible, by sewing or gauze packing, those articular surfaces which had been seriously injured as well as the damaged surrounding soft parts; all devitalized tissue being removed by scissors or the knife. In practice this teaching has been generally accepted. Gaudier in particular insisted upon the most careful removal of all tissues injured by the passage of a projectile, including skin, muscular tissue, and aponeurosis, making this dissection as carefully as he would if he were removing a tumor, paying particular attention to accurate hemostasis. Thereafter the raw surfaces are united by deep sutures and an effort made to secure immediate healing.

In classifying wounds of the knee, aside from those huge mutilations which indicate amputation, Berard alludes to the injury which he calls a seton, produced by a conical rifle bullet from a distance of 400 or 500 yards, not exhibiting an explosive effect and passing through, the wounds of entrance and exit being much alike. There is an immediate bloody effusion into the joint, causing in a few hours characteristic globular swelling, a little pain at first, with great disability. These cases run an entirely favorable course, though not always, since gas gangrene at times develops. It would seem wise to practice at once excision of the devitalized skin at the point of entrance and exit of the bullet, and also excision of the entire tract of the ball by means of an arthrotomy, which thus enables the joint to be evacuated of its contained blood. When this perforating wound is due to a deformed or a glancing ball or a fragment of shell the danger of infection becomes very much greater. Pieces of filthy clothing are often carried in with the missile. The wound of entrance is large and irregular, the wound of exit often torn. The operator should always regard it as infected and likely to lead to gangrenous and septic complications. There should be hemostasis, cleansing of the synovial cavity, and excision of all devitalized tissues. Balls which lodge in the joint without traversing it, though they may heal under conservative treatment, should be removed at once. Even though they are not deformed balls, fragments of shells or bombs always imply infection, and here the need for immediate surgical opera-

tion is imperative. The infections include staphylococcus, streptococcus, enterococcus, pyocyaneus refringens, bacillus of Nicolaier, and the vibrion septique, together with many others.

The actual injuries of the joint vary from slight abrasion of the cartilaginous surface to extensive comminuted fractures of the patella, condyles of the femur, and the articular extremity of the tibia. The treatment of these more extensive injuries is removal of cartilage and bones which are three-fourths free, together with all injured surrounding soft tissues, often implying a long and tedious dissection. Thereafter the synovial cavity is closed and the divided tendons sutured. If after this operation there is left a distinct cavity, resection would seem to be indicated; this without drainage if the damaged soft parts have been carefully dissected away. Berard strongly advises against unicondylar resection or removal of either the femoral or tibial epiphyses, instead of both, because of ultimate lessened function if this is done. Concerning the chemical disinfection after operation it is recognized that there is a period following the introduction of microbes by a foreign body in which they increase slowly. This lasts for from six to twelve hours and is called by Berard the preinfectious stage. It is possible almost certainly to totally disinfect a traumatized area by resecting the wound tract. Mechanical disinfection is possible of accomplishment in thirty-six hours and has been reported as long after the wound as sixty hours. As opposed to this, very simple penetrating wounds will at times develop acute gangrene in less than thirty-six hours.

Gregoire reported to the Surgical Society in January, 1917, that he had treated 102 cases of wound of the knee with but a single death. There were two amputations, four resections, and 96 radical treatments with closure, giving four failures and 92 successes. In 17 of 29 cases the fluid drawn from the articulation gave anaerobic cultures. In these 29 cases cultures made from the foreign bodies were always positive, usually containing perfringens and streptococci. Mocquot and Monod in 144 cases of wound of the knee report eight deaths. Of those cured 106 were incident to conservative treatment or conservative intervention, 35 followed primary or secondary resection, and 5 amputations.

The general feeling then in regard to wounds of the knee is that they should be opened freely, thoroughly cleansed by mechanical removal of devitalized parts, the synovia of the cavity should be closed, and the part should be immobilized and treated, and watched by the surgeon who performs the operation for at least two or three weeks, when mobilization may begin. As to the ultimate results of this treatment statistics are not available. It is quite certain that some cases are cured and often regain strong and painless knee-joints. Thus Mariche reports concerning 32 prompt arthrotomies that 20 had practically ankylosed, and only one had complete restoration of function. These arthrotomies were performed through a U-shaped flap, which, of course, involved cutting the patellar ligament. Eight lateral arthrotomies gave very much better results. Of three cases with extensive bone wound in which there had been prompt arthrotomy with curettement, but not resection, one had to be again arthrotomized and drained and two others submitted to difficult resections.

Berard speaks strongly in favor of the Carrel-Dakin method as especially applicable to the osteoarticular lesions with blood flowing into the cavity from comminuted fracture. Statistics are recited concerning 113 patients who presented perforated wound of the knee either without bone lesion or with one that was very slight. The wounds of entrance and exit were treated by tincture of iodine. The joint effusion was drawn off, pressure dressing was applied, and the joint was immobilized. All recovered rapidly with complete restoration of movement. Eighty-three cases of more serious wound were treated in divers

ways. At first in December, 1914, to September, 1915, after toilet of the wounded tissues the articulation was drained, the joint then being immobilized. The dressing was changed every day, with various antiseptic irrigations. Of twelve cases of moderate severity, two recovered promptly and one with preservation of movement. Five recovered with ankylosis and five were amputated, one dying of septicemia. Of thirteen with rather extensive articular injury, two got well without suppuration and with fairly free movement. Ten suppurated, and of these six were amputated, with three deaths. In the second period, September, 1915, to July, 1916, the Carrel method was applied in every case after free opening of the articulation. In twenty-six cases in which the bony lesion was trifling there were fifteen cures with complete restoration of movement, two cases of ankylosis without suppuration, and nine suppurations of the articulation. One died of septicemia following amputation. There were four amputations following resection. In those seriously wounded three got well without suppuration after removal of fragments of bone. Three got well after deep resection. In the third and most recent period 22 wounds of the knee were treated by free excision of all the injured tissue, arthrotomy and irrigation with either Dakin or ether, the tissue being closed by immediate suture, but draining for twenty-four hours; immobilized for ten days, then passive motion; at the end of fifteen days methodical mobilization. In 22 cases 19 got well with movement, three after resection; none died and none were amputated. These figures seem to show that the treatment to be regarded as standard is that of immediate surgical intervention, complete removal of all badly damaged tissue, including bone, cartilage, and soft parts, and twenty-four hours drain from the closed synovia, excepting in those cases in which the firm cartilage had not been injured.

Concerning war wounds of the knee which are freely suppurating, free arthrotomy is advised, followed by the Carrel-Dakin treatment and extension. To this the author gives unqualified praise.

REPORTS ON THERAPEUTIC PROGRESS.

THE INFLUENCE OF THYROID FEEDING UPON CARBOHYDRATE METABOLISM.

To the *American Journal of Physiology* for July, 1917, KURIYAMA reports his work on this subject. He states that fresh thyroid gland of pigs or desiccated thyroid (Parke, Davis & Company) administered by mouth in doses of 3 to 5 grammes (fresh) or 0.5 to 1.7 grammes (desiccated) per day, decreased the glycogen content of the liver of white rats distinctly in three to five days. Control animals, fed on the same diet with the addition of muscle tissue or egg, do not show any such change, even when the food amount is regulated so that they lose as much in body weight as the thyroid-fed animals.

The influence of thyroid feeding upon liver glycogen can be very easily removed by omitting thyroid from the diet. The liver shows its normal glycogen content two or three days after the cessation of thyroid administration, even when the loss of body weight has not been regained. This phenomenon seems to show that the changes resulting from thyroid feeding and causing the loss of liver glycogen are not of a serious morphological nature.

When dextrose is introduced parenterally to fasted rats which show a very low glycogen content of the liver, the amount of liver glycogen increases markedly in a few hours. This does not seem to be the case in the thyroid-fed rats.

Experimental hyperthyroidism does not change the sugar content of the blood in either rats or rabbits.

Spontaneous glycosuria does not result from thyroid feeding in either rats or rabbits.

The tolerance of thyroid-fed rabbits for dextrose, parenterally administered, does not differ from that of normal animals.

Nearly the same degree of hyperglycemia and glycosuria can be induced by adrenalin injection in thyroid-fed as in control rabbits.

The adrenal gland of thyroid-fed rats contains approximately the same amount of adrenalin as that of normal animals.

SYPHILIS AND PREGNANCY.

THOM in the *Medical Record* of July 7, 1917, states that syphilis in the pregnant woman should be treated as it is when it occurs in others. That is, salvarsan, mercury, and potassium iodide should be exhibited sufficiently and properly to cure the disease. In the treatment of pregnant women, however, there are certain refinements which should be observed in order to attain the best results for the mother and her unborn child.

In giving salvarsan it must be remembered that the drug has been known to cause premature expulsion of the fetus; but in Thom's opinion this danger is remote. If the woman's veins are sufficiently prominent the salvarsan should be administered intravenously, unless she is suffering with myocarditis or if her blood-pressure is abnormally high. If her veins are not prominent enough and for the other causes mentioned the salvarsan may be given by the rectum. A saline is given, and after the bowels have moved the lower bowel is thoroughly cleaned with a normal saline enema; after which the salvarsan solution is allowed to flow into the rectum through a catheter attached to a glass funnel. This method, while not much used, is, in Thom's opinion, almost as efficacious as when the drug is injected intravenously. It has the advantage of not increasing the blood-pressure, does not produce "water sickness," and is much easier to give to a nervous patient. Should the woman be threatened with eclampsia, salvarsan and mercury should be withheld until the urine is free from albumin.

Thom does not advise intramuscular injections of insoluble mercurials, such as the salicylate or gray oil, in pregnant women—or in any woman for that matter. His reason for this is that when such a menstruum is injected into the buttocks the layer of fat prevents its absorption and painful abscesses are prone to occur. If the patient's veins will permit he prefers to inject the mercury intravenously. A solution of bichloride, or mercury benzoate, is prepared so that each ten minims represents 0.006 of the drug. The initial dose is ten minims in 15 Cc. of warm normal salt solution. The procedure is the same as when salvarsan is given, only that the blood is allowed to run into the syringe and mix with the solution before it is injected. By so doing the chemical combination which thus occurs renders the solution non-irritating and the danger of phlebitis is avoided. When properly done absolutely no ill effects are produced (which cannot be said when horse serum is used), and it is the most efficient and promptly acting method of introducing the medicament into the system. The patient should receive two injections a week for six weeks. Treatment should then cease for a month and then be renewed.

If it is not possible to give mercury this way the next best way is by inunction. During the course of her pregnancy the woman should receive from sixty to ninety inunctions; each thirty inunctions from four to six weeks apart. In giving inunctions it is best to give one each day for six successive days, and then rest the patient a day, on which a hot bath is taken. Thom is in the habit of giving potassium iodide during the course of mercury and for a week or two thereafter, as it assists in eliminating the mercury, and as mercury acts best in a state of flux, *i.e.*, while being eliminated, the maximum effect is thus obtained. Patients under mercurial treatment should rinse the mouth several times a day as a guard against stomatitis. As pregnant

women sometimes have trouble with their teeth the services of the dentist should be requisitioned if necessary. Rest and a tranquil state of mind should be encouraged. The last the medical attendant can materially aid in by maintaining an optimistic outlook. The bowels should be cared for by the administration of a mild aperient as occasion requires. Sexual intercourse should be forbidden after the third month. In those cases in which it is not possible to give inunctions, the mercury may be administered by means of suppositories.

These patients require no other treatment, the mercury and salvarsan being sufficient to overcome any anemia that may be present. In some instances a bitter tonic may be given to improve the appetite. Treatment should be persistent; careless, casual treatment is, in Thom's opinion, almost as bad as none at all.

LEAD POISONING IN CHILDREN, WITH ESPECIAL REFERENCE TO LEAD AS A CAUSE OF CONVULSIONS.

BLACKFAN in the *American Journal of the Medical Sciences* for June, 1917, says he wishes to urge that energetic prophylactic measures be taken with children who habitually eat painted articles in order to guard against the development of lead poisoning. Since his attention has been directed to lead poisoning he has found a number of children who nibble the white paint from enameled cribs.

In all patients with convulsions in which the etiological factor is not clear, lead should be suspected. This can be readily determined, as in the majority of instances there are other evidences of the condition—*e.g.*, the lead line, basophilic degeneration, and the presence of lead in the feces.

The examination of the spinal fluid may prove to be an index as to the seriousness of the affection and of prognostic aid. In three of the four patients changes were found. In one patient changes were present in the spinal fluid for many months, and the patient eventually succumbed. In another patient who has recovered, and in whom the convulsions were not severe, the spinal fluid could not be examined at the time of the convulsions. Four weeks later the spinal fluid contained twelve cells and the globulin reaction was normal.

PYLOROSPASM IN INFANTS.

In the *Journal-Lancet* of July 1, 1917, SEDGWICK ably discusses this subject and expresses the belief that breast milk should be given in every case. It can always be obtained, and every severe case in his series received it. Buttermilk and buttermilk mixtures are valuable adjuvants.

Dehydration must be avoided. This can be accomplished by enteroclysis, hypodermoclysis, and tube-feeding. Baby K. entered the hospital dehydrated, weighing 2100 gms. After two and one-half days it weighed 2700 gms., having gained 600 gms., or 20 ounces. This was accomplished by enteroclysis and tube-feeding.

External heat must be carefully used. The heat-regulation of these infants is often very poor.

Gastric lavage was found to be of definite value, especially when followed by gavage. Longer intervals of feeding (three- and even four-hour intervals) gave the best results. At times chloral hydrate by rectum in large doses was of decided value. Stimulation, usually camphor given hypodermically, tides the infant over at times. Efficient nursing is absolutely necessary in severe cases.

Ibrahim has summed up the question of operation as follows:

1. Many cases may be cured by operation, and remain well.

2. Not only those which are to be considered as pure spasm, but also those with the most severe clinical picture which show also upon autopsy later that there is genuine hypertrophy, may frequently be cured by internal treatment and remain well.

3. It is absolutely not necessary, so far as the treatment is concerned, to make a definite distinction. The palpability of the pylorus, which is so often considered a criterion, cannot be used as an indication

for operation. Sedgwick has collected twenty-nine cases in which the tumor of the pylorus palpated distinctly, and yet they recovered completely by internal treatment.

Ibrahim has collected the following statistics:

Mortality of all cases treated internally (232), 46.1 per cent.

Mortality of those in Germany treated internally (83), 22.9 per cent.

Mortality of Heubner's cases treated internally (21), 9.5 per cent.

Mortality of all operative cases (138), 54.3 per cent.

Scudder's report included seventeen cases upon which he operated, with three deaths, a mortality of 17.6 per cent.

In conclusion, operative treatment under the very best conditions gives a low mortality. Operative treatment under unfavorable conditions gives a very high mortality. Internal teatment under the best conditions gives a lower mortality. Internal treatment under improper conditions gives a high mortality. Proper internal treatment supported by proper operative treatment in selected cases gives the lowest mortality. The later results in cases under internal treatment, as well as operative treatment, are excellent.

FURTHER STUDIES ON THE EFFECT OF ADRENALIN UPON MUSCULAR FATIGUE.

GRUBER in the *American Journal of Physiology* of July 1, 1917, says that in the fatigued unaltered nerve muscle adrenalin may increase the height of muscular contraction by a twofold action, by improvement of the blood supply (vasodilatation) and by its chemical action upon some substance in the muscle.

In a muscle in which the nerve is cut and stimulated, adrenalin in small doses, however administered, does not better the circulation and must therefore produce its effect of increasing the height of muscular contraction by its chemical (specific) action alone.

The following three processes which normally go on in the muscle may be greatly accelerated by adrenalin, and it is not improbable that one or all of these will finally prove to be the way in which adrenalin produces its effects:

1. The conversion of glycogen into sugar.
2. The reconversion of lactic acid into sugar (transformation of fatigue products).
3. The oxidizing of lactic acid into carbon dioxide and water (destruction of fatigue products).

THE USE OF NITROUS OXIDE ANALGESIA IN OBSTETRICS, WITH DESCRIPTION OF A SIMPLE APPARATUS.

In the *New York Medical Journal* of June 30, 1917, CHERRY points out that in the administration of an anesthetic during labor there are certain facts that should be ascertained before the general adoption of it. It is necessary to know what effect the prolonged use of the gas has on the mother and fetus. As to the mother, we should be sure that there is no interference with uterine contractions causing prolonged labor; that the blood-pressure is not increased materially; that there will be no secondary relaxation of the uterus tending to postpartum hemorrhage; and that there will be no toxic effect upon the kidneys and liver. In relation to the fetus, we should know that the fetal heart during the administration is not affected, and that no degree of asphyxia is present at birth. It is furthermore necessary to ascertain whether a sufficient amount of analgesia is obtained to warrant the expenditure of time necessary in giving the anesthetic.

At the Harlem Hospital in the Obstetrical Service of Dr. G. L. Brodhead, nitrous oxide has been administered to eighty-four patients during labor, and upon these careful examinations made. Nitrous oxide alone has been used in these cases without oxygen. The apparatus has been a simple one consisting of a nasal inhaler to which is attached a rubber tubing ending in a small rubber breathing bag. From this bag a tubing is joined to the reducing valve.

This valve is controlled by an adjustable screw attached to a wheel. This valve is set in by a clamp to the gas tank opening, and the flow of gas to the inhaler is entirely controlled by this after the tank valve is widely opened. This valve is similar in character to a needle valve on a carbureter, allowing for a maximum or minimum amount of gas being used.

The method of administration has been to adjust the inhaler over the patient's nose and to keep it there by an elastic head strap, the patient being in bed or on the delivery table. When the patient begins to complain of labor pains the administration of the gas is begun. The time of commencing the administration is usually toward the end of the first stage, when dilatation of the cervix is about three to four fingers. The gas is then given at the beginning of each contraction in sufficient quantities to ease the pain, and at its subsidence is discontinued. The patient is instructed to tell the obstetrician when the pains are beginning, and before the painful contractions have got well under way the gas has been administered in sufficient quantities, so that the full force and painful effect of the contraction has been diminished. This is repeated as often as pains occur. The amount of gas necessary to give complete or partial analgesia varies with different patients. Some neurotic and temperamental women require a great deal more than others of the phlegmatic type. This, naturally, has to be left to the judgment of the anesthetist.

As the second stage progresses and the presenting part advances on the perineum and appears at the vulva outlet, the nitrous oxide is discontinued and chloroform administered by the nurse, and the obstetrician prepares himself for the delivery of the child, which is then brought into the world under chloroform administered to the obstetrical degree. The object in changing to chloroform for the short time the head is passing over the perineum is to eliminate the necessity of employing a special anesthetist for administering the nitrous oxide gas. By this means the obstetrician himself can ease the pains of labor at the time when they are severe by the use of nitrous oxide, and later deliver the patient by changing the anesthetic to chloroform as in the usual case of labor. The expense of the administration is very slight in comparison to the amount of good accomplished. In an average case, in which nitrous oxide is started at the beginning of the second stage, one-half a tank is the amount used for the completion of labor. This, of course, varies with the individual's susceptibility to the analgesic effect, as was said before.

Of the eighty-four patients to whom gas was administered, thirty-eight were primiparæ and forty-six multiparæ. Forceps delivery occurred in four instances: three low and one medium forceps. In two cases in which pituitrin was used for inertia, four were multiparæ and two primiparæ, making six cases in all, or seven per cent. There were four breech deliveries, and one craniotomy in a contracted pelvis, with a dead fetus. The systolic blood-pressure was increased fifteen millimeters in one case, ten millimeters in two cases, and five millimeters in three cases. It was decreased twenty millimeters in one instance, and remained unchanged in seventy-seven cases. The fetal heart was unchanged in eighty-two cases, slowed ten beats in one case, and twenty beats in another. There was no maternal mortality. The fetal mortality was one, and autopsy on this baby showed a congenital atelectasis. The baby's mother had gas administered for five minutes.

There was one stillbirth; in this instance the fetal heart had not been heard throughout labor. In twenty-five cases there was complete analgesia, or 29.4 per cent. In fifty-eight cases there was moderate analgesia, or 69 per cent. In one case analgesia was absent, or 1.6 per cent. In this last instance the absence of analgesia can be accounted for by the fact that the patient was refractory and did not breathe properly. Amnesia was complete in five cases, moderate in three cases, and absent in seventy-six.

The length of time of the administration of the gas varied from five minutes to four

hours and twenty-five minutes. Asphyxia of the child occurred in three cases, each one of which had the umbilical cord around the neck one to three times. All three infants were revived. Cyanosis of the child occurred in two cases. In the other eighty-two cases there was no cyanosis. Cyanosis of the mother occurred moderately at the beginning of the gas administration in one case, and cleared up as labor advanced. One patient continued to have considerable cyanosis throughout. In the other eighty-two cases there was no cyanosis. The second stage in thirty-two primiparæ averaged one hour and fifty-five minutes. The second stage of thirty-one multiparæ recorded averaged one hour and twenty-two minutes. There were no postpartum hemorrhages, resulting from secondary relaxation of the uterus. No uteri were packed. Ergot was given, however, as a prophylactic after the completion of the second stage in every case.

From the above series of cases recorded and analyzed it can be deduced that with nitrous oxide administered alone during labor no ill effects upon mother and fetus were noted; that the resort to forceps or pituitrin was not more necessary than in the average cases of labor; that there was no tendency to postpartum hemorrhage; that the prolonged administration did not cause damage to the kidney or liver as far as could be observed clinically. These results have also been noted by others. Various observations made upon the effects of nitrous oxide on the individual organs lead one to conclude that it is the ideal anesthetic to use in obstetrics. A greater degree of analgesia can be obtained without complete narcosis; no kidney or liver changes have been noted following the administration over prolonged periods, because the elimination of nitrous oxide is entirely through the lungs; nitrous oxide remains in the tissues a very short period following its administration, which was shown by Kemp, who observed that 20 per cent of nitrous oxide found in the blood after administration was reduced in two minutes' time to 6.09 per cent. The apparatus described above is of such compact and small size that it can readily be carried in the obstetrical bag. The gas tank with suitable covering and handle can easily be transported to each case of labor by the physician, or can be sent previously to the patient's house before labor begins.

In conclusion it may be said that the administration by the method described can be carried out satisfactorily by every physician practicing obstetrics at a minimum expense, and with the satisfaction of relieving the majority of patients of about 90 per cent of the severe pains of labor with no deleterious effect upon either mother or child.

FOCAL INFECTIONS.

Writing on this topic in the *Southern Practitioner* for July, 1917, BRYAN states that the best he can say under the head of treatment is to make careful examination, both subjective and objective examination, then remove any foci that can be removed.

Cholecystitis, which is always associated with cholelithiasis, is a focus that produces systemic diseases, and especially does it show its effects on the myocardium. After removal of stones, or maybe removal of the entire gall-bladder, the myocardial change is noted to improve, provided it has not undergone destructive changes.

In his cases complaining of stomach trouble the majority of the causes are outside the stomach. Cabot in his Differential Diagnosis, analyzing fifteen thousand cases of stomach trouble, showed that over twelve thousand were due to troubles outside the stomach. Among these cases cholecystitis and appendicitis are the most prominent of the intra-abdominal troubles.

Neglected gonorrheal foci in posterior urethra, prostate, and seminal vesicles may and often do cause systemic or arthritic diseases.

It is not an easy matter to find all the foci that are contributory to the causes, but we must not stop because we find the patient has simply hypertrophied tonsils but must search the entire body. Bryan remembers seeing a young man who had nephritis, and

in search for foci the tonsils were found enlarged and removed, which did not cause any exacerbation of his nephritic symptoms, nor did he seem to improve. His teeth were *x*-rayed and several foci were found. After extraction of the teeth he had several chills with high fever and general reaction. There were marked disturbances in urinary findings, but as his gums healed he improved rapidly. When one operates on the focus that is responsible for the systemic disturbance, then there seems to be more reaction than by operating on an innocent or unsuspected focus.

It is a warning worth while to say that in cases in which we have multiple foci, as are often found around the teeth, too much manipulation or operation should not be done at one sitting, because we stir up infection and make many abrasions which act as portals of entrance for an overdose of the toxins and bacteria. This is especially true in the cardiorenal cases which have a myocardium which is already overtaxed and weakened from a degenerated process. This is capable of causing an exacerbation of an old nephritis, which often leads to uremia and death. Before operating on the cardiorenal case it is wise to know as near as possible the condition of his blood-pressure, measuring as near as possible the condition of the myocardium; make functional tests by use of phenolsulphonephthalein of the capacity of the kidney. By taking these precautions we may know better how to attack the foci of infection. In cases with a blood-pressure that the systolic readings vary at different beats of the heart and there is a frequent extra-systole with phthalein permeation test showing twenty or thirty, we should be slow to interfere with foci. Furthermore, there is danger of getting a general septicemia. To illustrate, Bryan saw a young man three years ago who had his tonsils removed because they were hypertrophied and he had some slight arthritic pains occasionally. Just a few days after his tonsils were removed he was seized with acute polyarthritis that involved practically all joints, and he was confined to his bed about six weeks.

BACTERIAL INFECTIONS OF THE URINARY TRACT FROM THE STANDPOINT OF VACCINE THERAPY.

BASU in the *Calcutta Medical Journal* for May, 1916, states that the value of treatment of urinary infections with vaccines may be summarized as follows:

1. Vaccines are of use in acute and subacute infections of the urinary tract.

2. As the flora causing the infection is very varied, an autogenous vaccine should be used whenever possible. [In infections with coliform bacilli an agglutination test should be carried out with the patient's serum against the bacillus isolated; if positive, the chances of success with vaccines are greater.]

3. Vaccines are not of much use in chronic afebrile cases of pyuria; they may alleviate the symptoms, but do not effect a cure.

4. Bacteriuric cases are not much benefited with vaccine treatment, but considering the fact that a few cases have been influenced, the treatment is worth trying in "carriers."

5. Vaccine treatment should always be carried out in connection with general treatment, rest, dieting, urinary antiseptics, etc. The treatment should not be carried to extremes.

THE MEDICINAL USE OF GLYCERIN.

The *Lancet* of June 9, 1917, states that in England there is now no glycerin being allotted for medicinal purposes, and pharmacists who have exhausted their supply can only obtain more by borrowing from those who have some left. As was noted four months ago, the Ministry of Munitions considered that the stocks then in the hands of pharmacists should be sufficient to meet the legitimate demands of prescribers. An analysis of prescriptions undertaken by the *Chemist and Druggist* thirty years ago showed that glycerin came out ninth on the list of favorite drugs, and its use both in mixtures and as a toilet preparation has probably much increased since then. But neither as a solvent, a demulcent, or a flav-

oring agent is glycerin at all indispensable, and medical men would do well to assist the pharmacists in restricting its use to the few remaining purposes—perhaps in the case of calf lymph or in organo-therapeutic extracts—in which hardship would result from its withdrawal. It should hardly be necessary to point out that to prescribe glycerin freely in a lotion might place the conscientious pharmacist in a difficult position. He is prohibited by law from supplying it direct to one customer for toilet purposes, and it would be invidious for him to supply it to another customer for the same purpose on a medical man's orders.

OIL OF CHENOPODIUM AND CHLOROFORM AS ANTHELMINTICS.

HALL and FOSTER in the *Journal of the American Medical Association* of June 30, 1917, state that their experimental findings indicate that oil of chenopodium should be accompanied by large doses of castor oil, and that when so given it is an uncommonly effective and quite safe anthelmintic for use against ascarids. Chloroform in castor oil, in therapeutic doses, is the most effective anthelmintic they have found for use against hookworms, and they consider it as safe as thymol or any other effective drug for use against hookworm disease.

THE TREATMENT OF NEURITIS, WITH SPECIAL REFERENCE TO SCIATICA.

The *Lancet* of June 16, 1917, contains an article by SAINSBURY in which he well says that at all times sciatica is apt to be an obstinate affection, so much so that, as one authority has put it, its treatment, or rather its resistance to treatment, has come to be regarded almost as an *opprobrium medicinæ*. It is for this reason that he is anxious to draw attention to Dr. Wingfield's treatment, which in its simplicity of procedure leaves nothing to be desired, and in its effectiveness has been so encouraging thus far that it is to be hoped others will be induced to give it a trial and thus test its efficiency. An additional reason for giving prominence to the method at the present moment will be found in the considerable prevalence of neuralgias and myalgias among the British invalided soldiers.

The treatment consists in the direct application of the strong hydrochloric acid of the B. P.—in common parlance, fuming hydrochloric acid—to the skin, along the line of the inflamed and painful nerve. The acid in question contains 31.79 per cent of gaseous hydrochloric acid and has a specific gravity of 1.160; in the British text-books it is written down as an *escharotic*. That this acid should be capable of safe application to the bare skin will probably come as a great surprise to a good many who, like the writer, had been accustomed to treat it with great respect as a corrosive acid. The *modus operandi* is first to mark out the line of the nerve pain and tenderness as it happens to present itself in the individual. Sir William Gowers describes the areas of pain in sciatica as "usually most intense in certain spots—(1) above the hip-joint, near the posterior iliac spine; (2) at the sciatic notch; (3) about the middle of the thigh; (4) behind the knee; (5) below the head of the fibula; (6) behind the external malleolus; (7) on the back of the foot." These areas are to be selected when present. In general the practice of the writer has been to carry a broad line of application, some 1½ inches across, straight down the back of the thigh from the gluteal fold to the popliteal space; another application of like breadth for about three inches behind the head of the fibula along the oblique course of the external popliteal nerve at this spot; lastly, for some 5 or 6 inches behind the external malleolus directly downward; and below the malleolus obliquely on to the dorsum of the foot. The extent of the tenderness will guide more or less as to the extent of the application. A wad of cotton-wool, firmly compressed into a knob of the size of the knuckle of the middle finger, is used to suck up the acid, of which about half a drachm to a drachm will be required. The charged wad, grasped by the finger and thumb (previously vaselined), is then car-

ried gently along the line of application above described. The degree of firmness may be increased subsequently if necessary, and the part may be painted two or three times at one sitting if the skin bears the acid well; the first application should be light and single in order to gauge the sensitiveness of the part, and if the integument happens to be thin and delicate it should receive correspondingly light treatment; Dr. Wingfield prefers to apply the acid with a camel's-hair brush. A considerable smarting is sometimes complained of; in other cases little more than a tingling or sense of mild heat is felt. After the application a light covering may be thrown over the part till the skin is dry. The smarting soon passes off and the slight redness induced disappears also; no dressing is required. Rarely, in delicate skins, is a papular rash excited; it should be allowed to subside before reapplication of the acid. Blistering has not been observed either by Dr. Wingfield or the writer. The treatment may be repeated twice a week if need be, perhaps oftener; it should be continued so long as the pain and tenderness continue. Massage may with advantage supplement the treatment, and particularly if there has been obvious wasting.

In three cases of sciatica recently admitted into the Bermondsey Military Hospital, Ladywell, the results have been striking and greatly appreciated by the patients themselves. Two of these were bad cases of long duration, and in one there was marked wasting of the muscles of the leg and thigh. Dr. Wingfield has had equally good results in sciatica and in the neuritis of other nerves also, and only once, in a case of neuritis of the upper arm, does he recall the occurrence of troublesome rash, lasting about fourteen days; this he attributed to a too free use of the acid. Amongst his cases he records a case of a neuritis of the arm accompanied by an acute eczema which prohibited the use of the acid; in this case he got rid of the eczema by the application of oleum Deelinæ, and having done this was able to apply the acid and cure the neuritis. These cases occurred for the most part in his practice when physician at Winchester.

How does the acid act? It cannot be by virtue of its acidity—*i.e.*, its power to neutralize alkalinity—for there is no alkali to neutralize on the surface of the skin, and the power of penetration of the integuments by this highly volatile acid, free to evaporate without let or hindrance, must be minimal indeed. Neither can it be due to its power to act as a counter-irritant, thereby driving blood to the surface *(ubi stimulus ibi affluxus)*, and at the same time sending centripetally, for all they are worth, its sensory stimuli, the objections being that the afflux of blood observed is very slight and very transient (the development of a persistent congestion or mild inflammatory state is quite exceptional), and that the actual nerve irritation produced is far below that which iodine and other established counter-irritants set up, with such disappointing results in respect of the cure of neuritis.

The explanation we must leave for the present, the point to arrive at now being the establishment, on a large experience, of the clinical value of the acid in the treatment of sciatica in particular and of neuritis in general, and, perhaps, of that nondescript class of complaint, now so prevalent and so troublesome, labeled "myalgia." Some cases of the last-named class—*e.g.*, lumbago and allied painful conditions—have responded encouragingly; but at this stage it would be unwise to make too wide the terms of reference of this remedy; let the *fiat experimentum*, therefore, limit itself to sciatica and other forms of well-defined neuritis. The value of hydrochloric acid in these affections being confirmed, the investigation of the relative value of other members of the group of acids should follow naturally. The group is a large one, so large that perhaps it would be best to proceed next to the congeners of hydrochloric acid—viz., the other halogen compounds, hydrobromic and hydriodic acids. Though, according to the opinion of some, pharmacology be but an alluring madness, let there be "method in't."

SOME PRACTICAL CONSIDERATIONS IN CHRONIC HEART DISEASE.

PATEK in the *Wisconsin Medical Journal* for June, 1917, states that his views may be briefly summarized as to the measures of relief in broken compensation as follows:

1. *Rest*—absolute and prolonged—the first essential in every form of decompensation. Later, the heart's response to exercise, and the presence or absence of dyspnea, are good indicators of its improved function.

2. *Digitalis*, when given in the usual therapeutic dose, does not increase blood-pressure, and may be safely given in all cardiac breakdowns. It will often be found useful in small tonic doses, even when systolic tension is high.

3. *Opium* is of inestimable value, and is indispensable in most cases of broken compensation. When combined with digitalis, the latter often has an effect which it cannot produce acting alone.

4. *Diet* may reduce high pressure and relieve symptoms due to hypertension. In cases of decompensation with dropsy, with a pulse of fair volume, the Karrel-Kur (1 quart of milk daily in divided doses, without the addition of other food or drink) is frequently followed by startlingly quick cardiac response, and an early subsidence of the dropsy.

5. *Depletion* by calomel, blue mass, or other cathartics is often called for, before digitalis can make an impression upon the disabled heart, because the mass movement of blood gives rise to splanchnic engorgement, thus creating an impediment to the circulation.

6. *Venesection* in high tension with symptoms is a remedy of no mean value. An acutely oncoming epistaxis has probably often prevented a cerebral accident; we can do likewise with our lancet, and should resort to it more frequently than is our custom.

7. *Vasodilators* Patek places on the lowest rung of this therapeutic ladder, because—while in very common use—their reputation for service has exceeded their efficiency. They are not heart tonics, and are only given where high pressure head symptoms are present, or anginoid attacks exist or threaten; here the vasodilators are indispensable and will often act promptly and excellently, but their action does not extend beyond symptomatic relief, and is very evanescent. When nitroglycerin fails, it may be because too small a dose is given. Several doses, repeated at very brief intervals, may give speedy relief, where the usual small dose fails. Thyroid extract, while frequently not reducing the tension, will give marked symptomatic relief. Patek has found it particularly useful in allaying distressing tinnitus and dizziness.

8. Other measures—stimulants, sedatives, and diuretics—are useful also, but those mentioned Patek considers of prime importance, indispensable in acute cardiac breakdowns, particularly of the cardiorenal type.

RECENT RADIUM THERAPY.

The *Prescriber* for June, 1917, points out that the periodical reports of the London Radium Institute may be regarded as a record of the progress of radium therapy in England. The Institute, while it is not the only one of its kind in Britain, has exceptional facilities and opportunities for testing the value of radium as a therapeutic agent, and its reports invariably show a moderation in tone that might well be copied elsewhere. The report most recently published covers the work done from January, 1915, to December, 1916. In all 1400 cases were dealt with during the two years, but the results of treatment are noted in 1157 only. Of these 52 were cured, 172 apparently cured, 498 improved, and 251 not improved; treatment was abandoned in 144 cases, and 76 died.

The detailed report shows that in small epitheliomata affecting glabrous surfaces the results are encouraging, but in epitheliomata of the buccal, laryngeal, and pharyngeal membranes, while temporary improvement frequently follows, the final result is usually disappointing. In uterine carcinoma the symptomatic improvement is most striking, and in some instances cases previously

declared to be inoperable become operable. The results in carcinoma of the rectum are by no means constant or uniform; generally those cases do best which occur in patients over fifty, and in which the growth is annular, vascular, and situated in the upper half of the rectum. As regards mammary cancer, the report says that radium should never be used as a substitute for operative interference in early cases. In slow-growing cases of the atropine type it is often useful in checking the progress of the disease.

Of all forms of malignant disease, rodent ulcer is the one which is most amenable to the action of radium. Lesions not previously subjected to other treatment, which do not affect mucous membrane, bone, or cartilage, and are small in size, can usually be cured by one treatment. Sarcomata usually do well, under vigorous treatment, if dealt with before dissemination into any of the internal viscera has taken place. Certain forms of lymphadenoma generally derive benefit, and mediastinal tumors are particularly susceptible to the action of radium. In fibroid disease of the uterus satisfactory results are often observed, and the same may be said of papilloma of the bladder, though few cases of this last have come under notice. Lupus vulgaris usually responds better to Finsen light, but when this fails to effect a cure radium may be used with fair prospects of success. Nevi, warts, and papillomata generally do well under radium, and the treatment of keloid is most successful. Other skin diseases amenable to radium treatment are pruritus, chronic eczema, psoriasis, and *x*-ray dermatitis. Radium is sometimes of great value in exophthalmic goitre, while the daily administration of radium emanation solution often produces remarkable improvement in arthritis deformans.

The use of radium at the Edinburgh Royal Infirmary during 1916 has recently been reported on by Dr. Dawson Turner (*Lancet*, 1917, i, 546, April 7). The sixty-six cases treated included rodent ulcer, inoperable malignant disease, exophthalmic goitre, and nevi. Among other points it is stated that sarcomata are more amenable to radium treatment than carcinomata; rapidity of growth is no bar to its employment, the cells of such growth being more vulnerable than those nearer the normal; and it is found that round-celled sarcoma reacts more favorably than the spindle-celled or the polymorphous-celled variety.

These reports go to show that while radium is a valuable therapeutic agent, it has its limitations as well as its advantages. The reports also confirm previous findings in this respect, and show definitely in what direction we may look for best results. The technique is as important in radium treatment as in any branch of surgery, and it is essential that the element be used only by those thoroughly skilled in its employment. It is now generally recognized that too large a dose is worse than no dose at all—the exact therapeutic dose has to be carefully ascertained before treatment can be carried out successfully. The great cost of radium is a bar to its indiscriminate use, and the establishment of Radium Institutes is the only way to insure that the greatest amount of good may be obtained from its employment. Radium substitutes as a rule do not give the same results, and it is only in the study of radium itself that we can hope for progress.

SOME ASPECTS OF MALARIA IN CHILDREN.

In the *Interstate Medical Journal* for June, 1917, DEADERICK states that in the treatment of malaria in children the best practice is to administer the quinine at short intervals, say every two or three hours. While children bear quinine in relatively large doses better than adults, the size of the dose should be regulated by the severity of the attack and the age of the patient. In average cases, children from six months to two years of age may be given from ½ to 1 grain of quinine every three hours; from three to five years, 1 to 2 grains; from six to ten years, from 2 to 2½ grains. These quantities may be increased in severe attacks. The drug is ordinarily given by mouth. Where cap-

sules cannot be used, recourse must be had to a tasteless preparation or to a disguising vehicle. Euquinine and tannate of quinine are the best of the tasteless preparations. The former must be given in slightly larger doses, the latter up to double the dose indicated above.

The most efficient liquid for disguising the taste of sulphate of quinine is the syrup of yerba santa, at least one drachm of which should be given for each two grains of the quinine. In cases with pernicious symptoms the drug must usually be injected intramuscularly in dilute solution. The best salt for this purpose is the dihydrochloride. Intravenous administration is preferable, but the veins of young children are sometimes very difficult to penetrate. Rectal administration of the solution or suppository may be employed to supplement the other methods. The buttocks should be pressed together for one-half hour after insertion to aid retention.

Inunction of quinine and lard is a common practice in the South. It should not be depended upon as the sole method, but may be employed as an adjunct. Deaderick has had no experience with inunctions of quinine and glycerin, which are said to be very effective. Calomel, mercury and chalk, and castor oil are the most efficient purgatives in the treatment of malaria in children.

EFFECT OF INGESTION OF COFFEE, TEA, AND CAFFEINE ON THE EXCRETION OF URIC ACID IN MAN.

In the *Journal of the American Medical Association* of June 16, 1917, MENDEL and WARDELL state that the addition of strong coffee infusion to a purin-free diet causes a marked increase in the excretion of uric acid.

The addition of Kaffee Hag—a decaffeinated coffee product—to a purin-free diet does not cause any increase in the excretion of uric acid. If, however, caffeine is added to the Kaffee Hag the excretion of uric acid is decidedly increased, as in the case of coffee.

The effect of adding tea to a purin-free diet is similar to that obtained by adding coffee to the same diet.

The increase in excretion of uric acid after adding coffee, tea, or caffeine to a purin-free diet seems to be proportional to the quantity of caffeine ingested.

The increase in the amount of uric acid excreted under these conditions is equal to the quantity of uric acid which would be obtained by the demethylation and subsequent oxidation of from 10 to 15 per cent of the ingested caffeine.

ABSCESS OF THE LIVER.

The *China Medical Journal* for May, 1917, contains an article by LUDLOW in which he discusses this subject in amebic infection. He says that among the operative procedures advocated are the following:

Aspiration Method: This may be done by means of a trocar and cannula with rubber tube for drainage. This method was used with success by Manson. Others have simply aspirated one or more times. Of late some have aspirated and at the same time have given the emetine treatment. Some of the disadvantages of this method are: (1) repeated aspirations are often necessary, and in certain cases open operation must be resorted to after aspiration has failed; (2) difficulty of retention of tight-fitting cannulas or stiff rubber tubes, on account of the constant movement of liver; (3) the pus sometimes is not discovered by aspiration, or it may be too thick to flow through the cannula.

Method of Approach through Abdominal Incision: In this operation, as usually performed, incision is made in the epigastric region, the liver is fixed to the abdominal wall by rows of stitches through its capsule and the peritoneal covering to the edges of the abdominal incision. The opening is maintained by packing, and the opening of the abscess delayed twenty-four to forty-eight hours.

The disadvantages of this method are: (1) two operations are necessary; (2) drainage is not good; (3) infection of the abdomen may occur.

Transthoracic Method: In his book on "Tropical Medicine," Jackson writes: "If there is bulging between the ribs we may expect the abscess to have for its covering the diaphragm and the pleural layers. These will require stitching together in order to prevent the escape of pus into the pleural cavity. A resection of one or two ribs must precede this stitching. This done the abscess may be opened by an incision through pleura and diaphragm. Deep-seated abscesses should rarely be approached in this way as the steps of rib resection, uniting the diaphragmatic and the parietal pleural layers, anchoring of the liver to the wound, and incision of the hepatic peritoneum, are all preliminary to the search for pus within the liver substance. The situation of the liver at the bottom of a deep recess, its movements to and fro with respiration, hemorrhage, and the technical operative difficulties unite to make this a deservedly unpopular operation."

While this may be true in an approach to the liver as indicated, yet if a portion of the ninth rib near its costal end is removed the above difficulties are largely obviated.

In most of the cases of Ludlow's series the following method has been used: A preliminary dose of morphine (grain ¼) or H. M. C. tablet No. 1 is given. The aspirator is employed for diagnosis only when the patient is brought to the operating-room and all is in readiness to proceed with the operation.

The aspirator is usually inserted with local anesthesia. In certain cases in which existence of an abscess was strongly suspected, Ludlow has operated even after failure to obtain pus by aspiration, and has each time been rewarded by evacuating a large abscess filled with a very thick pus. Lately, when the diagnosis has seemed very certain, he has operated without using the aspirator. Ether or chloroform is administered, but the anesthetic must be used with great care and as little as possible given. Incision is made parallel to the ninth rib, beginning about two inches from the costal margin. A portion of the rib two inches in length is resected, the diaphragm incised, and the liver exposed. A small incision is made in its capsule, blunt scissors inserted into the abscess cavity, and the wound enlarged by opening the scissors and drawing them out. As soon as the cavity is opened the finger of the operator is inserted and the liver held close to the wall while the pus is allowed to escape. After most of the pus has been evacuated search is made for any other compartments of pus. The cavity is packed with gauze, which is left undisturbed for thirty-six to forty-eight hours.

After this the abscess is treated by drainage with rubber tube and gauze. Counter-drainage has been made in some cases. In large abscesses, after the pus has been evacuated, the drainage has sometimes been interfered with by the changed position of the liver. In the first few operations an attempt was made to sew the liver capsule to the parietal peritoneum, but in the last twenty cases this was not done. Ludlow tries to keep the patients on the right side after operation.

Treatment by Emetine: During the year 1912 no emetine was used. The patients operated on during that year all made good recoveries.

In 1913 emetine was used in three out of four cases. It was given twice a day (¼ grain) for a week following operation. Except in one case in which amebæ were found in the feces it seemed to be of no special importance in hastening the recovery.

In 1914 emetine was used in four out of six patients. This time it was given in ½-grain doses twice a day for six days. During this year there was no marked improvement which could be attributed to emetine, but Ludlow continued its use because others had reported such good results.

In 1915 it was given in 1-grain doses once a day for a week. During Ludlow's furlough in this year Dr. Oh operated on six cases of liver abscess, following the method of operation as described above. All the patients made a good recovery. He reports that he used emetine over longer periods than one week, but could see no

rapid progress after its use. Since Ludlow's return to Korea he has omitted the use of emetine, except in the last case, and it was given then because of bowel disturbance which simulated dysentery, though the amebæ were not found. It is not his desire in any way to discourage the use of emetine in these cases, though his judgment is that the matter of securing and maintaining good drainage is much more important.

In conclusion Ludlow makes the following suggestions:

1. Keep a mental attitude of suspicion as to the possibilities of liver abscess in localities where dysentery is prevalent, and do not exclude liver abscess because of normal pulse, temperature, respirations, or blood count.

2. Use the aspirator only when all preparations are made for further operation. Only positive findings are of value.

3. While it may be necessary to vary the operation according to the conditions found, yet in most cases the operation described above should prove satisfactory even in those cases in which no adhesions are present.

4. Emphasis should be placed on the necessity of keeping a good opening for drainage. If this is left to an assistant, unless he is well instructed, he is very apt to let the external opening close too quickly.

THYMOL TREATMENT OF TRICHINOSIS.

In the *New York Medical Journal* of June 16, 1917, KAHN points out that the second stage of trichinosis infection is difficult of treatment because the parasite has left the intestinal canal and has lodged itself in the muscles and other tissues of the body where it is difficult to reach by means of remedies administered by mouth. It is futile to give thymol by mouth after the parasite has wandered out of the alimentary canal. The thymol does not circulate in the blood as such after its absorption from the alimentary mucous membrane. Its antiparasitic properties are neutralized in the liver in the following manner: Thymol is metaisopropylcresol. From the intestine it is absorbed into the portal circulation, and there conjugated with sulphuric and glycuronic acids and excreted in the ester form in the urine. This process of conjugation is the means used by the body to detoxicate the aryl compound. It is obvious then in order to attack the trichinæ in the muscle and tissues, a method of administration of thymol other than administration per os must be resorted to. Parenteral injections of thymol would exclude the conjugating influence of the liver. The thymol would be absorbed in the blood and would circulate as such, and thus be able to attack the parasite *in situ*. From the success that Kahn has obtained in the treatment of trichinosis in the Western Pennsylvania Hospital, Pittsburg, he would suggest the following method of procedure:

Fifty grains of thymol are dissolved in 50 Cc. of sterile olive oil, which has been autoclaved for several minutes. The solution is then resterilized and used. The patient is given from 2 to 3 Cc. of this solution subcutaneously or intramuscularly daily for seven days. The urine is examined daily for evidence of any kidney irritation, in which case the administration of thymol should be stopped or the dose reduced for a few days. After a week's treatment the administration should be discontinued for about a week or ten days, and then a week's treatment should be again instituted.

In Kahn's experience, such a course of treatment does not induce any toxic effects due to the thymol. In cases in which a septic temperature occurs temperature becomes normal after four or five doses. The pain in the muscles, the edema of the eyelids and face, the dull mentality of the patient, all due to the parasitic influence, become very quickly relieved. With the destruction of the parasite in the tissues it will be observed that the eosinophiles in the blood become very much increased, and the sections of the muscles will show destructive processes around and in the

parasite. Kahn has observed that after thymol administration showers of leucocytes appear in the urine, which upon staining were proved to be mostly eosinophiles. Before the thymol treatment this was not observed in the same cases. In normal individuals the administration of thymol does not induce an eosinophilia, nor are there present in these normal individuals any eosinophiles in the urine after thymol injections.

It may be advisable to try this method of treatment in cases of cysticercus, filaria, and echinococcus invasions of the tissues.

THE TECHNIQUE OF LUMBAR PUNCTURE.

Foster in the *Lancet* of June 2, 1917, writes on this topic and points out that in the first place a restricted flow may occur drop by drop, simulating the normal rate, or, on the other hand, five or six drops may run in rapid succession, followed by a pause. This latter phenomenon would at once suggest that the mouth of the cannula was not lying free in the arachnoid space. Another point is that when such a restricted flow occurs the respiratory movements are not imparted to the column of fluid. The explanation of this occurrence must of necessity be largely a matter of conjecture. A possible explanation is furnished by the surmise that the dura mater is pushed in front of the needle and then pierced, the mouth of the cannula thus lying in a narrow chink between the approximated dorsal and ventral dura mater. The dura mater is bound to the bony canal by loose areolar tissue which could be easily separated by a comparatively blunt needle. In this regard Foster might remark that this contretemps occurs most frequently when the needle fails to reach the theca at the first plunge and has already struck bone. Further, he had more often met with this difficulty at the end of a series of eight or ten operations on different patients when the same needles had to be reboiled and used a second time. The simple maneuver of gently withdrawing the needle will frequently establish a good flow, possibly by widening the interval between the surfaces of the dura mater. Rotation of the needle will in some instances establish a full flow, particularly if the needle has been introduced in such a way that the mouth of the cannula does not look directly toward the cephalic aspect of the arachnoid space. If these maneuvers fail a full flow will always be obtained by taking a sharp needle and selecting another space.

A "dry puncture," except in cases of hydrocephalus, Foster takes to be proof positive that the needle has not entered the theca. Where the fluid is thick and purulent and a good flow cannot be obtained even with the assiduous use of the stylet it seems probable that, as Dr. Horder suggests, the needle may have entered a loculus. A fresh puncture at another level will often secure a more abundant flow. When the fluid is blood-tinged and not obviously purulent it is better to perform a fresh puncture in order to obtain fluid free from blood for cytological examination. Foster has rarely found fluid blood-stained on a second puncture at another level.

THE FOOD VALUE OF MEAT PREPARATIONS AND MEAT EXTRACTS.

The *Boston Medical and Surgical Journal* of June 14, 1917, expresses the belief that a great deal of misapprehension still exists as to the food and medicinal values of soups, broths, and the various meat preparations and meat extracts. The laity have a great deal of faith in them, and the profession is not clear enough on the subject to take a positive stand relative to them. While they do no direct harm, they are of harm indirectly because they are relied upon to give a nourishment which it is not in their nature to give, and which might be given except for their use as a food. A review of most of the more recent investigations brings out the fact that practically none of these products has any real food value.

Soups and broths are, of course, widely used as articles of diet. Their main virtue lies not in their food content, but in their flavor. They are condiments rather than foods. One pound of beef cut up and boiled with one-third of a pound of veal bones, and the whole boiled down to one pint of strong soup, yields only about 5 per cent of solid matter, consisting of about equal parts of gelatin, fat, and extractives, with a little mineral matter. Most clear soups contain not more than two and a half per cent solid matter—at best a negligible amount of solid matter, even if that amount were real food. They have a culinary value as vehicles for starchy or nitrogenous matter—that is, for making thick soups. Moreover, clear soups do act as appetizers, and as such stimulate the gastric juices. In most cases this is not desired. In acute febrile conditions the nature of the diet permitted finds no use for an increase in the amount of the digestive juices.

Of the various beef preparations, beef extracts are best known and most widely used. They are urged upon the public in the guise of highly concentrated foods. About 34 pounds of beef are usually reduced to make one pound of beef extract, and this, in turn, is recommended for the making of about 70 pints of beef tea. Analyses of such preparations show that the total protein content ranges between 14 and 19 per cent. Not more than 7 per cent is albumose. The total nitrogen content is not above 9 per cent (*Lancet,* 1908, ii, 1222). Extractives of the xanthin type form the largest proportion of these preparations—even up to 60 per cent. In these proportions beef extracts are far from concentrated foods. Indeed, they cannot conscientiously be recommended as foods. Beef extracts have neither stimulating effect upon the heart nor upon the nervous system, nor do they have any effect to reduce the time for recovery from fatigue. They, too, like soups and broths, stimulate the gastric juices. Their proper place is in the kitchen rather than at the bedside. In the metabolic diathesis, where there is already an overproduction or retention of these meat extractives, the ingestion of extractives in the large quantities contained in these meat preparations can do much harm. It is possible, however, that any benefit derived from the use of these preparations may arise from the presence of vitamine, in which beef is so rich. Even this is but a probability, for it is not unlikely that the vitamine may be rendered inert during the reducing process in the preparation of these extracts.

In regard to the beef juices, when prepared by the warm process, even the small amount of soluble protein becomes coagulated. The cold process at least obviates this difficulty, but there is, on the other hand, the tendency to putrefaction. With neither process, however, is there at best more than 9.5 per cent of protein. The usual range is from .3 to 17 per cent. Some of the poorer qualities of beef juices are nothing more than beef blood. Beef juices containing even 5 per cent of protein would require three pints daily to feed an invalid. In circulatory, nephritic, or like conditions, this added introduction of fluids into the circulation increases the blood-pressure or puts an added tax upon the glomerular epithelium, which might be highly undesirable.

Beef tea can be entirely dismissed as a food or as anything else of value, for it rarely contains more than one and a half per cent of protein. Beef powders, on the other hand, are not really beef preparations in the sense that meats are rendered in their preparation. The whole beef is merely dried and then powdered. The meat protein is present undiminished, but the bulk is reduced. The meat powders are useful in some cases of forced feeding, for long marches and under like circumstances. Under present conditions of food stringency, the destruction of large quantities of food for their preparation is little short of criminal. The abolition of these foods from the dietary of the general public and from that of the invalid would be a step in the direction of rational food economy.

EPIDEMIC CEREBROSPINAL MENINGITIS.

In the *New York Medical Journal* of July 14, 1917, ROSENBERGER and BENTLEY report their study of 67 cases.

The treatment, as soon as a bacteriological diagnosis was made, consisted in the injection of antimeningococcus serum. In some cases 15 Cc. were given, but in most cases the initial dose was 20 to 30 Cc. After this dose, no matter how much fluid was withdrawn, 30 Cc. was the regular dose. In one case only 2.5 Cc. of fluid were obtained by puncture, yet 30 Cc. of serum were given. This amount of serum was given sometimes daily, sometimes in severe cases twice daily, and in others every second or third day according to the severity of the case. In some cases whose illness lasted over a week or ten days a total of 300 Cc. was given, and where these large amounts were injected, from 300 to 435 Cc. cerebrospinal fluid had been withdrawn. In some of the fatal cases the serum did not in any way alter the character of the fluid, the only marked point being a diminution of the number of or absence of microörganisms in the fluid. In one or two instances flushing the spinal canal with normal salt solution was tried, but with no good results. Following the administration of the serum, headaches were common, cramps in the legs were almost constantly noticed, but in only one case was syncope present, and this followed the too rapid introduction of the serum. In three cases urticaria developed after the third or fourth injection of serum. In one of these the wheals were of the giant type.

The summary of these cases is as follows: Number of adults, forty, of whom twenty-three were white and seventeen colored. In this group the mortality was approximately 55 per cent—fourteen white and eight colored. Eleven patients are now convalescent. Number of children from two months up to eleven years, twenty-seven, of whom fifteen were white and twelve colored. The mortality in these children was 40.7 per cent—seven white and four colored. In one, an extremely mild case, recovery took place without any serum being given, and in another, recovery followed the injection of 15 Cc. Serum treatment should be instituted at once after a bacteriological diagnosis is made, and the longer the time which elapses before its administration the more unfavorable the prognosis. It is a well-known fact that the mortality has been reduced from 80 per cent to between 20 and 30 per cent in some epidemics. In this epidemic the mortality was exceptionally high, although the serum treatment was instituted as soon as the case was diagnosed, and some even before a diagnosis was confirmed bacteriologically.

It is the firm belief of the writers that if these cases had been diagnosed earlier, and the serum given immediately, the mortality rate would have been decidedly reduced. It is also possible that in this series of cases the meningococcus was of an extremely virulent type, as it was proved in animal inoculations. In view of the high mortality in this epidemic, and the possible high mortality of other epidemics, it does not seem unwise to recommend that a dose of antimeningococcus serum be given in suspicious cases of meningitis where cloudy cerebrospinal fluid is withdrawn upon puncture. It appears reasonable to insist upon lumbar puncture in all cases in which a suspicion of meningitis exists, as there were a number of instances in this group where no puncture was made and others where puncture was made a number of days after the case came under observation.

The disease is of such a nature that specific treatment to be of any value should include administration of serum at the earliest possible moment. The adult patients were kept in the medical wards most of the time and no new cases developed. The children were all segregated in the isolation buildings, and attended by nurses and helpers. No new cases developed in nurses or attendants. In two instances three cases developed in one family, but in no other instance were there multiple cases observed. In those who lingered a week or ten days

the number of sequelæ was extremely small; one patient became deaf and one was stricken with blindness in the left eye. In two cases an endocarditis developed after convalescence had been progressing for more than two weeks.

TREATMENT OF POLIOMYELITIS WITH IMMUNE SERUM.

Writing in the *New York State Journal of Medicine* for June, 1917, TAYLOR states that the preparation of the serum used in the cases he reports was briefly as follows:

Collected aseptically, allowed to clot; serum separated, to which 0.2 per cent of trikresol was added and allowed to stand for twenty-four hours, filtered Berkefeld N, transferred to hermetically-sealed glass tubes and kept on ice.

Blood was collected from persons who had had the disease in the summers of 1914 and 1915, all of whom were otherwise healthy.

Serum was given intraspinally by gravity method, and subcutaneously and intravenously.

In all cases the clinical diagnosis was confirmed by microscopic and chemical examinations of the cerebrospinal fluid.

All of the cases were field cases. Most of them were in rural districts in widely separated parts of the State.

Of the nineteen cases treated, two died. One of these was practically *in extremis* at the time treatment was begun, 96 hours after onset of disease. Three were negative, the serum having been given 164, 192, and 288 hours after onset of the disease, at which time the temperature was normal and paralysis definite and marked. Serum was given to see if there would be any temperature reaction at that time. There was none.

In practically every case that received serum during acute febrile stage there was a definite temperature reaction within a few hours, namely, a rise in temperature, sometimes as much as three degrees. This was noted after first and second doses, even after so small a dose as 10 Cc. subcutaneously.

In six cases there was no further progress of paralysis, with improvement more or less marked. The remaining eight cases recovered completely.

1. Serum taken from cases of three years' standing appears to influence the course of the disease.

2. Serum prepared as described can be administered intraspinally by gravity method, and intravenously without danger, if well-known rules of precaution are observed.

3. Serum should be administered both intraspinally and intravenously.

4. Early diagnosis, confirmed by microscopic and chemical examination of cerebrospinal fluid, followed by administration of 30 Cc. or more of serum gives best results.

5. The administration of serum after the acute febrile stage is over and definite paralysis has developed is useless.

SHOULD THE COLON BE SACRIFICED OR MAY IT BE REFORMED?

In the *Journal of the American Medical Association* of June 30, 1917, KELLOGG virtually protests against modern methods of attacking the colon. He says that in his experience nine out of ten, or even a larger proportion of patients suffering from severe stasis involving the large or small intestine, or both, may be made well and maintained in good health by the thoroughgoing and persevering application of measures of treatment which wholly exclude surgical procedures of any sort. This statement is based on the successful treatment of several thousand cases of chronic intestinal stasis which had stubbornly resisted all ordinary measures of treatment. A few weeks is usually sufficient to bring the patient to a state of improvement in which two or three natural evacuations occur daily, and to establish a regimen, by the following of which the patient may maintain his improvement indefinitely. This, of course,

must be accomplished without the use of laxative drugs and mainly by dietetic measures.

In a few cases in which stasis is due to pronounced mechanical obstruction, comparatively slight surgical procedures will accomplish all that is necessary to render the dietetic and other measures above referred to effective. In by far the majority of cases in which non-surgical measures fail, the seat of difficulty will be found to be a prolapsed and adherent or incarcerated pelvic colon. As pointed out by Case in numerous papers, adhesions may be readily shown when present by a Roentgen examination. The operative measure required is a simple one. It is only necessary to break up the adhesions by careful dissection and to prevent recurrence of the difficulty by attaching the pelvic colon to the omentum, which is in turn made fast to the abdominal wall at a point near the umbilicus. By this procedure the pelvic colon is suspended by a swinging attachment which does not interfere in the slightest degree with the movements of the intestine and does not give rise to the pain from which patients usually suffer when the intestine is attached directly to the abdominal wall.

Another operation which is occasionally but less frequently indicated is repair of the incompetent ileocecal valve. This condition, however, is practically always secondary, and is rarely found except when associated with a prolapsed and adherent or incarcerated colon or a spastic condition of the distal colon. The operation for repair of the ileocecal valve is a simple procedure and not accompanied by greater risk than the operation of appendectomy.

Within the last ten years Kellogg has performed the operation of colectomy in twenty cases.

The indications for the operation in the several cases were as follows:

In seven cases, cancer of the cecum or ascending colon with obstruction.

In one case, tuberculosis of the cecum and terminal ileum with obstruction.

In one case, gangrenous colitis of the entire colon.

In four cases, extreme colonic stasis, the result of short-circuiting operations previously done elsewhere.

In seven cases, intractable stasis due to so-called Jackson's membrane or adhesions.

These twenty cases have been selected from more than 40,000 cases which have been treated in the Battle Creek Sanitarium clinic during the last ten years, or less than one in 2000. Most of these patients have been found to be suffering from intestinal stasis, but they were relieved by non-surgical means, or by simple restorative surgical procedures.

The non-surgical means which Kellogg has employed most effectively in relieving stasis are the following:

1. A low protein, bulky diet consisting largely of fruits, fresh vegetables, and whole-grain preparations.

2. The free use of bran or agar-agar, or a combination of both, at every meal. From one-half to an ounce of cellulose daily seems to be necessary to stimulate the bowels to normal activity.

3. The use at every meal of half an ounce to an ounce of liquid petrolatum. In some cases an emulsion of liquid petrolatum gives more satisfactory results, and the best results are often obtained from the use of petrolatum which melts at the temperature of the body.

4. Abdominal massage and special exercises for developing the abdominal muscles.

5. In very obstinate cases the patient takes, three or four times a day, a couple of tablespoonfuls of bran and as much fruit as he can eat. Fresh and stewed tomatoes are found to be especially useful. Lettuce and celery may also be used freely. The patient is allowed to take fruit between meals or whenever he feels inclined to do so. For persons suffering from hyperacidity, non-acid fruits, like bananas, pears, white cherries, and melons, are used. Occasionally it is found advantageous to make the diet consist wholly of green vegetables, raw and cooked, with bran or agar-

agar. This regimen will usually clean off the tongue and get the bowels moving two or three times a day within four or five days. Occasionally the regimen must be continued for a week or ten days. When mechanical obstacles to bowel actions, such as prolapse of the pelvic colon and adhesions or other obstructive lesions, are not present, this method will very rarely fail.

6. At first it is occasionally necessary to use an enema at 80° F. once a day. The patient should be required to go to stool on rising in the morning and after each meal.

7. In cases of colitis with a spastic condition of the descending and pelvic colon, the colon is treated by means of hot saline enemas, and afterward there is introduced into the colon, with the patient in the knee-chest position, several ounces of a liquid culture of *Bacillus bulgaricus* and *Bacillus bifidus*, to which is added a small amount of malt sugar and boiled starch, the purpose being to change the character of the bacteria growing in the colon and thus encourage the healing of the infected mucous surface.

8. In cases in which the lower colon has lost its normal sensibility, various stimulating applications are made, among the most useful of which is the electricity applied to the upper part of the rectum or pelvic colon by a bipole electrode; very weak solution of hydrogen peroxide (0.25 per cent); solution of citric acid (from 0.25 to 0.5 per cent); and a mixture of equal parts of carbon dioxide and pure oxygen gas (from 200 to 500 Cc.).

9. In cases in which the mucous membrane is atrophied as the result of chronic proctitis, it is found very advantageous to introduce into the lower colon at night 3 or 4 ounces of a preparation of petrolatum which melts at the temperature of the body. Such a preparation may be made by melting together equal parts of liquid petrolatum and paraffin.

10. The wet girdle worn at night and a variety of other hydriatic procedures are also found highly useful in dealing with stubborn cases of constipation.

Too much cannot be said in favor of bran and liquid petrolatum used in combination. One supplies bulk, which is necessary to stimulate the sluggish colon, and the other furnishes lubrication, which is required on account of loss of the normal mucus due to degeneration of the mucous membrane which results from chronic infection.

The last ten years will be known in medical history as the colectomy era. The introduction of the Roentgen ray has opened the way for exploration of the colon, as well as the stomach and other viscera. The time has come to call a halt on colectomizing and short-circuiting operations. Many hundreds of stomachs and colons have been "fixed," "pleated," "suspended," "short-circuited," "resected," etc., in many cases only because the Roentgen ray showed prolapse or "kinks," or "folds," or suspicious shadows of some sort. Larger experience is making clear the danger of too much intermeddling with nature's cunningly contrived and delicately constructed mechanism. The Roentgen ray has demonstrated that prolapse of the stomach and colon are not indications for surgical intervention. Lane's kink is definitely proved to be a consequence of intestinal stasis and not the cause of this condition. The movable cecum is not a pathologic state but a condition essential to the physiologic functioning of the colon.

Except in cases in which actual and severe mechanical obstruction exists, surgery is not indicated. By the liberal use of bran and liquid petrolatum in conjunction, not in succession, and the skilful use of a "fruit regimen" followed by a properly regulated low protein diet, practically all cases of intestinal stasis may be cured, excepting only the rare cases in which Roentgen examination shows actual mechanical hindrance.

Kellogg is convinced that the sober second thought of experienced surgeons, by which the value of every new surgical procedure

must sooner or later be determined, will demand such modifications of the Lane operations, short-circuiting and colectomy, as will relieve them of their most objectionable features and will restrict the use of these surgical measures to extremely rare and exceptional cases.

THE IMPORTANCE OF DUODENAL ALIMENTATION IN SEVERE DYSPEPSIA OCCURRING AFTER GASTROENTEROSTOMY.

In the *Medical Record* of June 16, 1917, EINHORN after pointing out that gastroenterostomy is the most frequent operation performed in organic disease of the stomach and duodenum states that not rarely after the operation the patient manifests a new train of symptoms which sometimes are just as severe as if not more so than those existing before the operation. Peptic ulcers in the stomach or jejunum in the vicinity of the new stoma, or adhesions, are the most frequent conditions causing the new disturbances. The most prominent symptoms encountered are pains, vomiting, and hemorrhage. Usually it is possible by a thorough examination and careful handling of the situation to ameliorate the symptoms. Liquid diet, large doses of bismuth, and washing the stomach play an important part. Occasionally, however, all these measures fail, and we are then at a loss to know what to do. Many of these patients have to undergo another operation, frequently with an indefinite result as to the future.

It is in this class of cases that Einhorn has frequently found duodenal (or, more correctly, jejunal) alimentation to be of great benefit, and he therefore considers it of interest to discuss this subject.

Whenever we have to deal with postoperative dyspeptic symptoms of a graver nature, it is best to make a thorough analysis of the case with regard to gastric secretion and food retention. Examination with the duodenal bucket is here of great importance. The string attached to the bucket shows whether there is a patent opening leading into the duodenum or jejunum, whether there be ulceration at the stoma, and ultimately whether the bucket has passed through the pylorus or through the new opening. The presence of blood-stain on the string below eighteen or nineteen inches speaks for ulceration near the stoma. If a yellow coloration (bile) appears on the string, beginning at about twenty-three inches or further down, it usually indicates that the bucket has passed through the pylorus. If the yellow discoloration begins at nineteen or twenty inches, it indicates that the bucket has passed through the new opening—for the distance from the cardia to the new stoma is much less than to the pylorus. Should there be a yellow discoloration on the string up at sixteen or seventeen inches, then we remain in the dark as to the patency of either the pylorus or the new stoma. We only know that there is a regurgitation of the intestinal contents with bile into the stomach, but we are in doubt as to how far the bucket has gone. In order to clear up this point, *x*-ray examinations with bismuth will be required.

In all cases in which the duodenal bucket has reached either the duodenum or the jejunum, treatment by duodenal or jejunal alimentation may be tried. This procedure gives complete rest to the stomach and pylorus, or the new opening, respectively, and so serves to ameliorate the condition.

SOME MISLEADING MEDICAL FADS OF THE TIME.

The *New York Medical Journal* of June 16, 1917, contains an article by ROBINSON in which he says that not many years ago we were overridden by specialists who extirpated ovaries and tonsils. Dr. William M. Polk, of New York, stopped the former operation in a measure, and Dr. John N. Mackenzie, of Baltimore, ended the latter. Operative attacks on appendices still prevail, however, and will do so, no doubt, as long as doctors ignore inflammation of the cecum and continue present methods of

medical treatment. To Robinson's mind these are frequently very bad compared to former procedures. Opiates and warm poultices with high enemata, rest, and liquid diet brought many patients around who are now daily sacrificed to the ready knife. If they survive the unnecessary operation, as of course they will usually, they suffer from adhesions, recurrent pains, and attacks of intestinal dyspepsia which they would not have if the appendix were still present to carry on its physiological rôle, which is surely important, although only acknowledged by a few.

Hardened arteries and high blood-pressure with the daily use of sphygmomanometer and the misinterpretations of its adepts are a source of great anxiety to many. Why not allow the old man or woman to grow old gracefully and kindly and not be tormented by one of the latter-day evidences of contracted mental vision? The heightened blood-pressure and the arterial condition are interdependent and preservative in many instances and should not be interfered with by foolish theories and practices.

The old-time practitioner knew well that to empty the bowels regularly and sufficiently by suitable purgatives or laxatives was rational and desirable, and he usually insisted upon it in his daily rounds. He did not fill up the belly of the sufferer with mineral oils or find it necessary to recur to most ill-advised laparotomies to get rid of kinks and ptoses. Carminatives and a simple diet, with an occasional day of relative starving, would cure many, many dyspeptics. It is not essential to cause further distress by ordering large doses of insoluble bismuth to be swallowed for diagnosis, which not seldom causes conditions afterward interpreted by the *x*-ray to be pathological when they were merely the result of unwise, wrong interference. Teeth which cannot be filled and cause continuous trouble or pain should be extracted, but every ailment of the human body, from headache to gall-stones, cannot be explained by the teeth, and these should not be taken out because erroneously they are considered the *fons et origo* of morbid symptoms. The science which makes and continues a Rockefeller Institute is great and good with proper limitations, but because a man can experiment knowingly upon a dog, a monkey, or a guinea-pig, does not prove to Robinson's mind that he is the man he wants when he is ill. Give him, he begs, the old-fashioned general practitioner with much experience in human ailments, a modicum of common sense, and a genial, sympathetic heart and mind, and every time, when possible, he will get the better of his bodily or mental ailments.

[Dr. Robinson is evidently inclined to adhere to the older methods of therapy.—Ed.]

CHESTNUTS AND ACORNS IN WAR SERVICE.

The *Lancet* of June 16, 1917, in an editorial reminds us that the manufacture of modern munitions has so far implied a certain demand on cereals which otherwise could be used for food. This is an unfortunate diversion, and it is gratifying to learn that, instead of using cereals, other materials not so far made fit for human food, as, for example, the common horse-chestnut, are to be employed. We may point out similar possibilities in regard to the acorn, vast quantities of which are wasted every year. The composition of these nuts has something in common, as will be seen from the following figures: Horse-chestnut—water, 38.9 per cent; protein, 4.8 per cent; fat, 4.6 per cent; carbohydrate, 50 per cent. Acorn—water, 6.3 per cent; protein, 5.2 per cent; fat, 43 per cent; carbohydrate, 45 per cent. The most important constituent of both is the carbohydrate, in the form of starch, while the acorn should have further value on account of the substantial proportion of fat which it contains. Neither nut has as yet been used to any extent for human consumption, and it is possible that their utilization in some way or other, whether for food purposes or not, may be one of

the results of the relative food shortage. The first step has now been taken in the substitution of these nuts for cereals in the production of munition agents. Other abundant vegetable products may also be pressed into service. It is, of course, possible to convert wood, linen, cotton, and the like into sugar, but the process of conversion does not appear to have attained practical dimensions or to have reached an economic stage.

GASTRIC CRISES OF CEREBROSPINAL SYPHILIS.

The *New York Medical Journal* of June 16, 1917, quotes LYON as stating that the treatment may be divided into the management of the acute attack and the treatment of the intercurrent periods. During the acute attack treatment consists of absolute rest in bed, abstinence from oral feeding, continuous lavage, administration of antispasmodics, such as atropine and belladonna, to overcome spasm, supplemented by a mechanical maneuver directed to stimulate the spinal nerves, to overcome a vagotony which gives rise to acute dilatation of the stomach. This is especially emphasized. For relief of pain he advises a trial of adrenalin chloride intramuscularly with final recourse to morphine. During the intercurrent period the patient's health should be built up in the attempt to prevent or abort further attacks. Rest, hygiene, and hyperalimentative diet, tonics, and above all the intensive use of antisyphilitic therapy by intramuscular, intravenous, and intraspinal routes, should be used.

THE BENEDICT TEST.

BRIGHAM in the *Boston Medical and Surgical Journal* of June 14, 1917, reminds us that since the introduction of the Allen treatment for diabetes, more and more patients are being educated in the method of testing their urine, which allows them to watch themselves more closely, and better results are naturally obtained. As a result many drug concerns are making the Benedict solution, which, on account of its being a single solution, is much easier for patients to use.

Recently Brigham has had two instances where the Benedict solution was absolutely unreliable, and for that reason it seems wise to let the medical profession know in order to avoid any serious mistakes. The following, a copy from the card published by Thomas Groom & Company of Boston, and gotten up by Dr. E. P. Joslin, is an exact copy of the card which is given by Dr. Joslin to his patients, giving the correct prescription for the Benedict solution and detailed directions for testing the urine:

FORMULA AND DIRECTIONS FOR THE BENEDICT TEST.

Copper sulphate (pure crystallized)....	17.3 g.
Sodium or potassium citrate.....	173.0 g.
Sodium carbonate (crystallized)*.....	200.0 g.
Distilled water to make.....	1000.0 Cc.

*One-half the weight of anhydrous salt may be used.

The citrate and carbonate are dissolved together (with the aid of heat) in about 700 Cc. of water. The mixture is then poured (through a filter if necessary) into a large beaker or casserole. The copper sulphate (which should be dissolved separately in about 100 Cc. of water) is then poured slowly into the first solution, with constant stirring. The mixture is then cooled and diluted to one liter. This solution keeps indefinitely.

For the detection of glucose in the urine, about 5 Cc. of the reagent are placed in a test-tube and 8 to 10 drops (not more) of the urine to be examined are added. The mixture is then heated to vigorous boiling, kept at this temperature for about two minutes, and allowed to cool spontaneously. In the presence of glucose the entire body of the solution will be filled with a precipitate, which may be red, yellow, or greenish in tinge. If the quantity of glucose be low (under 0.3 per cent) the precipitate forms only on cooling. If no sugar be present, the solution either remains perfectly clear or shows a faint turbidity that is blue in color, and consists of precipitated urates. The chief points to be remembered in the

use of the reagent are (1) the addition of a small amount of urine (8 to 10 drops) to 5 Cc. of the reagent, this being desired not because large amounts of normal urine would cause reduction of the reagent, but because more delicate results are obtained by this procedure; (2) vigorous boiling of the solution after addition of the urine, and then allowing the mixture to cool spontaneously; and (3) if sugar be present the solution (either before or after cooling) will be filled from top to bottom with a precipitate, so that the mixture becomes opaque.

It is often convenient to perform the test by placing the tube containing the mixture of the solution and urine in bubbling, boiling water, where it must remain with the water actually boiling for five minutes.

HEADACHE OF OCULAR ORIGIN.

Writing in the *Cleveland Medical Journal* for August, 1917, BRUNER says that we usually think of a headache which a patient has upon awakening in the morning as probably not being of eye origin; certainly it is true that headaches from eye-strain are more apt to come on after the patient has been up for a time, or toward the latter part of the day, or after some use of the eyes for close work or a trip down town. But a morning headache is not uncommon after an evening at the theater or moving picture show, or after some use of the eyes for close work the preceding evening.

Ocular headaches may be due to an error of refraction, or failure in the power of accommodation, as in presbyopia, or the lack of muscular balance, or simply weakness of the extra-ocular muscles. Inequality between the two eyes is a very common cause. In reference to the relative frequency of the various types of refractive error as a cause of headaches, myopia is least apt to produce them, while astigmatism, hyperopia, or hyperopic astigmatism is a more frequent cause. One very important point to bear constantly in mind is that it is often the slight error of refraction which produces headache and other reflex disturbances, while the high errors which greatly impair vision may cause little or no discomfort. Therefore, to test a patient's vision and conclude because he reads the normal and standard line that the eyes themselves are normal and are not the cause of the patient's headache, is often a grievous error. And likewise the mere fact that he has normal vision with the glasses which he may already be wearing is not proof in itself that the glasses are correct. In many instances, Bruner has obtained complete relief in patients in whom the ocular defect was so slight in amount, or the change in glasses so small, that he frankly told them that he considered it very doubtful whether the eyes would account at all for their discomfort. In some of these patients Bruner's doubts have been verified: the glasses have afforded no relief, but in so many instances has the correction of these slight defects afforded marked or complete relief that in doubtful or suspicious cases glasses are at least worth a trial. Small degrees of astigmatism at unsymmetrical axes in the two eyes or at certain particular axes are especially apt to produce headaches entirely out of proportion to their amount. Relief in many of these cases will come only when the patient wears the glasses constantly, and that, too, even though the glasses make no improvement whatever in vision. Let us get away from the idea that glasses are needed when they improve vision.

It is scarcely necessary to emphasize the importance of testing the refraction under a mydriatic. Too often the laity will go for glasses to an optician, whose office or store is now decorated with various diplomas and State certificates, which serve the more readily to confuse the ignorant or innocent public, and because these glasses do not afford relief they conclude that the headaches are not due to the eyes.

Accurate refraction work cannot, in

Bruner's opinion, be done in patients under forty-five, except in occasional instances, without complete cycloplegia, and frequently this procedure is necessary even beyond that age. Personally Bruner does not believe in the use of homatropine for children, but thinks that the more thorough and prolonged action of atropine is much preferable and more accurate.

Beginning presbyopia, or failure of accommodation because of age, is a very frequent cause of headaches, and such patients often have much trouble in getting accustomed to glasses or to the addition to their distant correction.

Weakness of the muscles or lack of muscle balance is also a frequent and very troublesome source of discomfort in patients whose eyes are otherwise normal or whose glasses perfectly correct their error of refraction. Such imbalance may call for prisms, for gymnastic exercises, and in rare, very rare, instances for operation upon the muscles.

The type of headache due to eye-strain varies greatly. Not a few of the so-called bilious headaches are of eye origin. Some neurologists and even some oculists have claimed that true migraine is not produced by eye-strain. Bruner confesses that he always feels more uncertain about obtaining relief by treatment of the eyes from attacks of migraine than from other types of headache, but he is equally certain that he has in not a few instances seen marked improvement both in the frequency and severity of the attacks and even complete cessation of them follow treatment of the eyes.

Eyes are at times kept in an irritable and sensitive condition by reflex disturbance from some other cause, such as an apical abscess or an impacted tooth or an abnormality in the nose, or sinusitis, some intracranial condition, some pelvic abnormality, or a chronic toxemia of gastrointestinal origin, so that the patient will suffer from headaches following the use of the eyes; but glasses, even though needed, will afford no relief or only partial relief until this condition is corrected. We also unfortunately occasionally encounter patients who will suffer headaches from an overuse of the eyes despite everything that can be done for their eyes. They possess hypersensitive eyes, or their weak eyes are simply a part and a symptom of a very sensitive general nervous system. The general practitioner must remember that the oculist cannot put strong eyes in a weak body, and the oculist must not forget that he needs the coöperation and help of the general practitioner. Again and again has Bruner seen patients who gave a history of ocular headaches beginning after a serious illness or operation. The refraction had not been changed by the illness or operation, but their power of endurance or their ability to overcome a slight defect had been loosened, and temporarily at least they may need help; or in other instances they should be forbidden the use of their eyes until they have more fully regained their general strength. Overuse of the normal eyes or of eyes properly corrected with glasses may cause ocular headaches, and especially is this true if the use is under unfavorable conditions, as poor light or artificial illumination. Some persons can endure more physical or nervous strain than others; the same is true of eyes. Then, too, most individuals at fifty or beyond cannot endure as much as they could at twenty-five or thirty, and this applies to their eyes as well as the rest of the body. Some eyes are not adapted to hard usage or will not stand the amount of use which another pair can endure with perfect ease. Eyes with pathologic defects, as corneal scars, or opacities in the lens, may continue to cause headaches despite everything we can do for them, and the same is true of eyes with irritable or inflamed retina or choroid or optic nerve.

Given a pair of irritable eyes, it is not sufficient merely to give that person glasses, or take care of their muscles; treatment of the eyes locally and by internal medication may be necessary before that person will obtain ocular relief. We cannot judge of

the value of glasses in many instances by the immediate effect. While one person may adjust himself to glasses or a change of lenses almost immediately, in another person it may be weeks or even several months before the full benefit is obtained.

Lastly, we must not forget that the treatment of headaches is not infrequently a process of elimination as to the etiology. In the same person may exist several conditions, any one of which may produce headaches, and one by one these defects must sometimes be remedied before we arrive at the real cause; or in other patients it is a combination of several causes that produces the discomfort, and relief will not be attained until all the pathologic conditions have been rectified. Whatever our special line of work or interest, we must not forget that first of all we are or should be general physicians.

DIGITALIS: ITS PROPER PLACE IN MEDICINE.

IVES in the *New York Medical Journal* of June 16, 1917, insists that the effects of the drug are dependent upon the nature of the lesion for which it is given. Clinical experience for ages has proved its beneficent action upon some patients, and a strange lack of response in others. This mystery is now rapidly being unveiled, as the combined studies of clinicians and laboratory workers prove the selective action upon certain forms of cardiac disturbance and an absolute lack of action in others. The myogenic theory of cardiac function is the key to the solution of the pharmacology and the clinical application of the drug as a remedy.

Certain laws directing its clinical use are now established: (1) The reaction to digitalis is far less effective when the rhythm is normal than when auricular fibrillation is present. (2) Whenever the heart is affected by toxins or agents which increase excitability, digitalis has little effect upon the rate, whether there is auricular fibrillation or whether the rhythm is normal. Thus in tuberculosis, typhoid, malignant endocarditis, rheumatic endocarditis, alcoholism, etc., the above holds true. (3) Experience shows that in auricular fibrillation, especially where there is a large amount of healthy heart muscle, rather than when extensively it is diseased, the reaction to digitalis takes place. The most marked response is found, therefore, in the youthful type of the disorder with a rheumatic history. When fibrillation occurs in the senile heart, especially in the absence of a rheumatic history, the failure to respond is very common. (4) It is important to realize that digitalis at times so affects the conducting bundle of His as to depress it, with production of partial heart block. (5) Digitalis proves of inestimable value in restoring muscle tone or, more properly speaking, the property of tonicity, in myocardial relaxation, especially when resulting from fibroid replacement occurring after the acute toxemias. The responsiveness of the heart to the drug indicates relatively the percentage of good cardiac muscle still present, for with lesions affecting its efficiency it is hopeless to expect a complete recovery of the strength exhibited by a healthy heart.

Physiologically, then, we base our expectations upon the following actions of digitalis: (1) It acts on the cardiac muscle, the intrinsic cardiac nerves, and the vagus center in the medulla. (2) It has some contractile action over the arterioles generally, but while contracting the vessels in the splanchnic area it seems to dilate those of the kidneys. The increased kidney secretion may result without a material rise in the blood-pressure. (3) Its action on the vagus slows the pulse-rate, and the diastolic period is made more complete. (4) Its specific inhibitory action over the conducting auriculoventricular bundle of His checks the discordant impulses arising in the auricle, thus slowing the ventricular rate in cases of auricular fibrillation and flutter. (5) Its selective action upon the musculature makes the contractions more powerful, its beats become more efficient,

the diastolic pauses become prolonged, and an increased volume of blood is thus delivered at each systole. (6) Through its action upon the musculature it increases the nutrition of the heart itself by forcing a greater volume of blood through the coronary circulation. Dilatation is lessened by the restoration of toxicity; the muscular rings about the auriculoventricular orifices contract more strongly; the mitral and tricuspid valves close more efficiently, thus lessening regurgitation. (7) Digitalis improves the tone in the arteries and veins through the auto-massage of the vessels as a result of the slower, stronger beat. The increased suction of the muscular contractions of the heart aids the circulation in the vessels. The diminished regurgitation, combined with the increased circulation in the veins, lessens venous congestion, and because of its action over the kidneys increases the secretion of urine. (8) Brunton recognized the diuretic action of the drug in four ways: It dilates the renal vessels and increases the pressure in the glomeruli; it lessens the resistance which the pressure of distended venous radicles in the kidney opposes to secretion; it stimulates the secreting cells directly; it increases the volume of the blood and somewhat alters its composition by causing absorption from edematous tissues and serous cavities. When it causes absorption of ascitic fluid from the abdominal cavity, it may act as a diuretic also by lessening the resistance opposed to the secretion of the urine by the pressure of the ascitic fluid on the kidneys themselves and on the ureters.

A word should be said on the tendency of digitalis to raise blood-pressure, as much undue anxiety prevails among the profession. The fear of increasing the burden of the heart already laboring against high pressure by raising the pressure by the use of the drug is unwarranted. Such a fear is wholly without foundation, for the consensus to-day recognizes that in the proper medicinal doses the drug does not affect the arterial walls, or, if it does, the effect is so slight as to be negligible.

RETROVERSION OF THE UTERUS AND OBSTETRIC PRACTICE.

JACKSON in the *Indianapolis Medical Journal* of August 15, 1917, asserts that the treatment of this condition consists in replacement of the uterus and maintaining it in its corrected position either by a mechanical support or by surgical operation.

Contrary to the general belief the care of patients postpartum is of much greater importance than that of the delivery, and it is the neglect of this duty which causes most of the invalidism following confinement. These patients should be examined carefully at intervals of a week for at least eight weeks after delivery. The touch in the early weeks may be made per rectum if one is not absolutely sure of aseptic conditions, and Jackson believes this should really be the general rule.

When discovered early in the puerperium much can be accomplished in the relief of retroversion by the judicious use of ergot to increase muscular tone and by posture, either by the Sims position, left lateroprone because of the relation of the sigmoid, or the knee-chest position, the choice being indicated by the general condition of the patient, the uterus having first undergone reposition. Here Jackson remarks, parenthetically, that these postures are a part also of the regular exercises to be mentioned in considering prophylactic care. Hot aseptic or mildly antiseptic low pressure vaginal douches are also indicated, and sterile glycerin wool tampons may be used for support and depletion of the tissues.

Later—that is, after the third week—a properly fitting pessary should be introduced to aid the maintenance of the normal uterine position and to favor, in so doing, the general involution of the pelvic structures.

There is no doubt that a properly fitting pessary of the Smith or Hodge type will maintain the uterus in position and in the majority of cases effect a permanent cure—that is, of course, when used in these puerperal cases.

Reposition must always be accomplished before attempting the introduction of a pessary. This sometimes offers considerable difficulty and may demand postural aid such as the knee-chest or Sims position. Jackson has found many very difficult cases comparatively easily corrected by grasping the cervix firmly with a tenaculum forceps and drawing it sharply forward, while two fingers of the vaginal hand were spread apart sufficiently to hold firmly back of the lateral ligaments as a fulcrum and permit the cervix to be shoved back between the fingers.

As regards the use of the pessary, Jackson believes it is too generally condemned, or at least ignored. It is certainly of great value in all of these puerperal cases, and he has found it very serviceable in many, if not the majority, of the ordinary gynecologic cases, and never hesitates to use it wherever operation for any reason is not to be entered into. He has seen, although he does not claim it to be possible in a great percentage of cases, a cure of retroversion in a virgin nullipara, and all of us who have the patience and mechanical skill to properly apply the instrument have seen cures in many cases, and symptomatic cures, *i.e.*, comfort while continuing the use of the pessary, in practically all cases in which it is once successfully placed. That there are many patients suffering from this condition who will not submit to operation for reasons more or less valid we all know. Such cases should have the benefit of an earnest effort at pessary support.

This fact is borne out by VanTeutem's observation in the Leyden Clinic, where in a series of cases 407 were treated with pessaries as against 344 operated on. G. Gibson treated sixty women of the outdoor clinic who were the subjects of "movable retroversion without other lesions and those with other lesions not in themselves demanding operation," and in concluding his discussion says: "These results show that much can be done by this much-abused method of treatment." Jackson's observation in three months at Broese's Dispensary Clinic in Berlin bears out this same argument; that is, many if not the majority of these gynecologic patients can be relieved by the proper mechanical support. The test in these cases in out-patient clinics is more crucial than in general practice, inasmuch as these are women of the working class, under-nourished and overworked.

Both skill and patience are necessary to the fitting of the pessary. It must be graded to the right size and shaped to properly support. It must not only produce no pain but no sensation. Jackson's stock question to these patients is, "Do you feel anything? Would you know if I did not tell you that anything was there?" It is not a question of pain but of any sensation of touch or pressure. One must also bear in mind the dangers of local irritation with consequent decubitus and inflammation. Hence the importance of the symptoms pain and leucorrhea, and careful supervision of the patient.

Cervical injuries demand repair whether observed in the puerperium or later in the gynecologic examination. They are causative factors, both as atria for infection which may produce adhesions, drawing the uterus into the cul-de-sac, and also by widening the central attachment of the uterine ligaments, thus shortening the distance between their two points of attachment with resultant relaxation.

It is impossible within the scope of this paper to treat to any extent a question of operative correction of uterine retroversion. That there have been more than seventy original methods or variations in technique described, all depending upon differences of mechanical conception of the importance of this, that, or the other anatomic structure in maintaining the forward position of the uterus, is sufficient evidence of its vogue and desirability. There is little difference in the principles of the more modern of these, for example, the Baldy-Webster and the Gilliam operations, and most operators use one or the other of these with or without unimportant modifications in technique. One of the latter, which Jackson wishes to

suggest as of possible importance, is the use of a non-absorbent and non-absorbable suture material such as Pagenstecher linen upon the ligaments rather than catgut. The current strife in regard to the function or not of the round ligaments normally as supports is hardly pertinent when all are agreed that they may be converted by careful surgery into supports or "guy ropes" so far as maintaining the anterior position of the uterus is concerned. Jackson has also found that pessary or tampon support sometimes aided in the after-care of operative cases within the first six or eight weeks.

In closing Jackson desires to make acknowledgment that there is little new in this presentation of an old subject, but he also wishes to emphasize the propriety and timeliness of its plea for "better obstetrics," or, in other words, more careful gynecologic prophylaxis, for this is the gentle art which preserves the health and comfort of mothers.

EMETINE HYDROCHLORIDE: A NOTE CONCERNING ITS INTRAVENOUS ADMINISTRATION.

In the *Southern Medical Journal* for August, 1917, LARIMORE states that the intravenous use of emetine would apparently give more adequate concentration of the emetine in the circulation. It obviates the soreness which follows the subcutaneous, and also, in a less degree, the intramuscular injections. This, however, is not so severe as unduly to favor intravenous administration. Its avoidance, however, facilitates the handling of certain types of patients. If emetine injected in any manner is adequately concentrated by the selective excretory faculty of the gastrointestinal mucosa, it is not necessary to secure its greater concentration by the intravenous injection. However, this selective excretory faculty is only presumptive and it is doubtful if it is exercised by the hepatic parenchyma or by the gums, and in the use of emetine for infection at these sites intravenous injection would seem to be more efficacious. After several injections there was noted in a few cases an arterial hypotension. A few cases gave no subjective reaction until after several doses, suggesting a cumulative action.

The intravenous administration of emetine in one-grain doses undiluted and rapidly injected, without serious or even inconveniencing symptoms, would indicate that it is a safe procedure.

THE PRESENT STATUS OF PHYSIOLOGICAL THERAPY.

The *New York State Journal of Medicine* for August, 1917, claims that hard and fast lines between functional and organic disturbance is now fast disappearing. The recent work of Cannon has shown that chronic emotional stimulation in nervous individuals may be the cause of many organic conditions. Cannon, in a recent book on "The Bodily Changes in Anger and Fear," has proven that there is an increase in adrenalin produced as a result of stimulation of the sympathetic system. He has shown that in emotional stress in case of struggle, such as in athletic contests, sugar is found in the urine, due to excessive secretion of adrenalin, which in turn causes the liver to throw out more glycogen than the system can take care of, and shows as sugar in the urine. This work is opening up an entirely new field.

Levy has recently treated a case which shows most beautifully the close relationship between the different endocrine glands. This patient was a woman who was referred to Levy by the late Dr. Elsner, suffering from a large fibroid, with tremendous hemorrhages. She was referred for *x*-ray therapy for the treatment of fibroids. This woman was a school-teacher of nervous temperament. She consulted Dr. Jacobson five years ago. Sugar was found in the urine, no doubt due to an extensive stimulation of the adrenals, due to depressing emotion. On being told that she had glycosuria and that she must be careful of her diet she was greatly shocked and developed

an exophthalmic goitre, which was treated by Dr. Tinker. Later she developed the fibroid with enormous hemorrhages, due to a perverted function of the ovaries. In this case we had a perverted function of the adrenals, causing glycosuria, later a perverted function of the thyroid causing hyperthyroidism, and then a perverted function of the ovaries which produced the fibroid and the hemorrhages.

A neurasthenic, as the result of an emotional shock, may develop either diabetes, or hyperthyroidism, or climacteric hemorrhages, or cardiovascular changes, or a combination of these. Surgeons are beginning to realize the necessity of treating the neurasthenic basis in many organic conditions; the necessity of rest before the operation in exophthalmic goitre cases and of rest after the operation, and the realization that the exophthalmic goitre is only one of the symptoms. This is also illustrated in cases of climacteric hemorrhages. The old theory was that they were due to endometritis, and that curettement would cure them. Now we know that these cases always develop in neurasthenic individuals in whom there has been excessive stimulation of the ovaries which results in a perverted function, and as the trouble is not in the uterus primarily curettement does not cure it, but the primary condition is a perverted function of the ovaries, producing a hormone which prevents coagulation of blood.

Perhaps the most remarkable therapeutic agent developed in the last few years is the use of the gamma ray in cases of fibroids. The time is not far distant when simple fibroids, especially in women over forty, will no longer be considered a surgical condition, but will be treated by means of the gamma rays. They can be treated not only symptomatically but clinically, for in many of these cases the tumor disappears entirely. Levy has treated over thirty cases by means of the gamma ray, and has produced a cure in 90 per cent of them.

The use of physical therapy has greatly increased since the Compensation Act has gone into effect, as the insurance companies are anxious to get the injured back to work as soon as possible, and we can greatly shorten the period of convalescence by these methods. While a good surgical result is necessary it is more essential to get a good functional result, and in a great number of cases the physical agents are a great benefit and aid to us in the after-treatment of fractures and injuries. One of the most common and one of the worst complications is adhesions, resulting from trauma or infection. There have been some advances that have been made recently in the treatment of these conditions which Levy would like to bring to our attention. Baking and manipulation have been known for some time and are extremely valuable, but these often fail, and in obstinate cases ionization is useful, saturating the negative pole with 2-per-cent solution of potassium iodide. It is often necessary to resort to the hard rays of the Coolidge tube to aid in softening the adhesions. By the use of the various physical agents, such as baking, massage, exercise, ionization, and the use of the hard rays, he has had some surprising results. Recently a very instructive case came under his observation. Dr. Pritchard sent Levy a man who had suffered a severe injury to the thigh, which left his foot cold and clammy. There was a marked disturbance in the circulation and the foot became devitalized. He was sent to Levy fourteen months after the accident, and within three months Levy was able to improve the circulation and bring back life to the limb by means of baking, massage, and various forms of electrical currents. He was so much improved that he was able to return to work, and has been working ever since.

In the after-treatment of these compensation cases it is necessary to get the confidence of the patient, showing him that we are working for his benefit, and we must make him understand that he will have a certain amount of aches and pains as a result of his injury for some time, but that these are not severe enough to

interfere with his work, and the sooner he returns to work the better he will be and the quicker he will get well. A great many of these individuals are satisfied with two-thirds of their wages without working, and they are very likely to exaggerate every sensation. Levy never tells them their ailments are imaginary, for this would make them angry, but he tells them they are looking at their troubles through a microscope, which greatly exaggerates them and makes them appear more severe than they really are. It often takes a great deal of encouragement and a great deal of persuasion to have them even try to work, especially in cases of men over fifty who have been out several weeks. A fact in regard to the after-treatment of fractures and injuries which it is necessary to recognize is the danger of firm adhesions developing, especially in elderly people or people of lowered vitality. It is best to treat adhesions conservatively before breaking them up under an anesthetic, by baking, manipulation, ionization, for this makes the part more flexible and there is less danger of tearing blood-vessels, producing a new fracture, or causing such marked reaction that more harm than good is done.

ON THE USE OF SMALL DOSES OF PITUITRIN FOR INDUCING AND SHORTENING LABOR AT TERM.

Stein and Dover in the *Medical Record* of August 11, 1917, state, upon the basis of their personal experience, that they are led to indorse: (1) The use of pituitrin in far smaller doses than the customary ones. (2) The use of small dosages of pituitrin in the first stage of labor as well as later on. (3) The use of small dosages of pituitrin for the induction of labor at term.

Small Dosages of Pituitrin During Labor.—Their claims are based on personal observations in sixty-four cases in which pituitrin in form of the Parke-Davis product was employed during the labors of forty primiparæ and twenty-four multiparæ. The pituitrin was always injected intramuscularly, as this was found to be a safe and highly efficient method of administration.

The usual dose consisted of two to three minims, far less than the smallest dose reported to their knowledge by most contributors to the obstetrical literature. A tacit agreement has apparently been arrived at among obstetricians making the contents of one ampoule, namely, 1 Cc., the standard dosage for the acceleration of childbirth when the labor pains are sluggish and inefficient as the result of uterine inertia. Judging from the literature, ½ Cc. is almost the smallest amount in which obstetricians, both here and abroad, have been willing to place their confidence.

Aside from the question of dosage, the proper time for the administration of pituitrin has been referred with equal empiricism to the later stages of labor after the os has become more or less dilated and the presenting part has become engaged. In their close clinical observations the uterine contractions set up by minimal doses of pituitrin were of the normal, rhythmical, physiological type, with a gradual rise and fall in intensity.

Pituitrin is now generally recognized as an efficient adjuvant during the progress of labor, although there seems to be an unfounded prejudice against its administration at the onset of labor in the dilatation stage, a period when the drug rendered excellent service in their clinical experience. This prevailing opinion against the use of pituitrin during the early stages of labor is no doubt due to accidents from 1-Cc. doses. By the use of minimal doses they have been enabled to administer it with perfect safety during all stages of the birth process.

A single three-drop dose proved sufficient, in their experience, for the production of efficient labor pains in about one-third of the total number of cases. Where pituitrin was repeated, the succeeding doses of 3 minims of pituitrin were

usually given at half-hour intervals, the average number of small doses in each case being 1.78, with an average dose of 3 minims.

The duration of labor in the forty primiparæ under these small doses of pituitrin averaged fourteen hours, and in twenty-four multiparæ eleven hours. In nineteen cases of this series in which the cervix was fully dilated when the use of pituitrin was begun, the average duration of the second stage of labor was one hour and three minutes. It is unnecessary to emphasize that this means a marked reduction in time of the expulsive stage.

No complications of any kind were noted in the 64 cases of this form of pituitrin administration. The mothers, without exception, did well under the use of pituitrin. Among the 64 infants there were but six still-births, and these were in no way referable to the minute doses of pituitrin, but the result of prolapsed cord and similar causes of fetal death.

In conformity with their own experience, a reduction of the large customary dose (1 Cc.) of pituitrin is recommended by Bandler, Schwartz, Bubis, Friedman, Norris, Druskin, and others. Bandler, for instance, finds one-third of an ampoule of the Parke-Davis preparation an entirely sufficient dose in ordinary labor, subject to modifications according to special requirements in a given case. Norris points out that the usefulness of pituitrin would not be diminished and its dangers would be lessened, if it were dispensed in doses equivalent to half the customary ones. Small doses of pituitrin are credited by Friedman with a greater efficiency than large amounts for stimulating the activity of the uterine muscle. Bubis likewise indorses the use of small doses of pituitrin, and he also points out that the drug may be administered in any stage of normal labor, where it will shorten the birth process from two to twelve or more hours.

There is no reason, in the opinion of Bandler, why the use of pituitrin should be delayed until the second stage has been reached. These views are well borne out by their personal observations on the largest series of cases on record in which pituitrin in minute doses has been employed as a routine medicinal agent in the management of ordinary labors. The freedom from complications and the shortening of the duration of labor certainly illustrate the efficiency of very small doses.

The employment of intramuscular injections of small doses of pituitrin for the induction of labor at term constitutes the most interesting and important part of their observations. In the cases in which this treatment was adopted (34) it proved successful in one-half the entire number (17), contrary to the statements abundantly scattered through the obstetrical literature to the effect that pituitrin cannot be used to bring on labor before the os has at least begun to dilate. Numerous writers in this country and abroad assert the non-efficiency of pituitrin in the artificial induction of premature labor and abortion (which is also the opinion of the writers), as well as labor at term (a conclusion with which the writers are unable to agree).

In view of the novelty of this plan of treatment, the method adopted at the Obstetrical Division of Harlem Hospital (Chief Dr. Brodhead), and also in private practice of one of the writers of this article (Stein), is herewith given in detail:

At 7 A.M. the woman receives one ounce of castor oil, and two hours later, at 9 A.M., an intramuscular injection of 2 minims of pituitrin, followed at 11 A.M. by a repetition of this dose. If labor pains are elicited, the pituitrin is resumed at intervals of one-half to one hour; if no pains result the treatment is stopped and another attempt is made on the third following day, again administering the same small dosage.

All the mothers in whom labor at term was induced by means of small doses of pituitrin did well, and the infants were invariably born in excellent condition.

In the successful cases, true labor pains usually began after the second small dose of pituitrin, sometimes after the first, or not

until after the third dose. In a typical responsive case concerning a three-para at term, labor pains began after the second dose. At half-hour intervals three other doses were given, making a total of four doses of altogether 9 minims. It agrees with the observations of others that in a certain number of normal parturient women—one-half their clinical material—absolutely no response to the administration of pituitrin for the induction of labor can be elicited.

The recommendation of pituitrin in small doses for the induction of labor at term without auxiliary measures of any kind is decidedly new. Together with the employment of mechanical means, in form of the bag, the use of pituitrin is indorsed for the induction of labor by Bandler, who finds that the repeated injection of pituitary extract often brings on or produces more marked labor pains when administered just as soon as discomfort and suggestive or actual pains begin after the introduction of the bag. In one of their own cases concerning a two-para who was three or four weeks overdue, the introduction of the bag and bougie served as a supplementary measure to a single intramuscular injection of a 2-minim dose of pituitrin. The child was born in short order and in good condition.

TOXIC GASTRIC HEMORRHAGE.

Crispin in the *California State Medical Journal* for August, 1917, asserts that toxic gastric hemorrhage is essentially a medical condition. Hemorrhage does not always mean chronic ulcer. Surgery should be resorted to for the calloused type of ulcer, and for this type only will it give the best results. Recognition of the true cause of hemorrhage from the upper gastrointestinal tract is sometimes most difficult. At times evidence will warrant exploration to prove or exclude peptic ulcer as a cause. The presence of a constitutional disease without sufficient evidence of ulcer makes medical observation and study, rather than surgery, advisable. In cases of hemorrhages of obscure origin, search for infected foci should be made and the possibility of their association with the cause of the hemorrhage should be considered. In addition, studies of blood diseases associated with bleeding, and further studies in blood-pressure, with recognition of transient hypertensive states, will help to define and separate hemorrhages having their origin in surgical ulcer from gastric hemorrhages of acute infective and toxic origins.

FATIGUE AND ALCOHOL.

In the *Lancet* of July 28, 1917, Kent thus concludes a sane discussion of this subject:

It appears, then, that the taking of alcohol has little immediate effect upon the physical side of fatigue, whatever its ultimate result may be. The amount of output may perhaps be increased to a small extent for a time, but the increase soon falls off and is replaced by a diminution. The influence of alcohol upon the psychical side of fatigue is more profound. It leads immediately to a feeling of renewed vigor and increased strength. But here also the effect is transitory, and repeated doses must be taken if anything lasting is required.

If we look at the other side of the question and ask, What is the influence of fatigue upon the taking of alcohol? The answer is clear. Fatigue, as we understand it, involves physical discomfort. The worker knows full well that this discomfort can be diminished by drink. What more natural than that he should turn to it? Because the effect is transitory the dose will be repeated again and again, and industrial alcoholism will be established.

Ordinary drunkenness is diminished amongst us, and we can afford to ignore its occasional appearance if we can destroy the infinitely more harmful industrial drinking. The problem should be placed upon a new basis. It should no longer be regarded merely as an industrial evil to be deplored or to be treated by an appeal to its victims; it is a scientific problem to be solved by an

appeal to the laws of cause and effect. Too long has it been treated with reference to symptoms only. Let it be treated on scientific lines, let the *cause* of intemperance be attacked, and let the attention which the great war has drawn to the lot of the worker bring to him the greatest possible blessing.

The data are sufficient for a solution to be reached. Alcoholism follows industry, but its severity is dependent upon the conditions of industry. Conditions determine fatigue; fatigue induces men to drink. Clearly, therefore, our attack must be on conditions. Where conditions have been improved fatigue and drinking have diminished.

The true cure for alcoholism is the provision of decent surroundings in the factory and in the home, adequate wages, leisure and relaxation, clubs, recreation rooms, indoor and outdoor games—in short, the elements of a healthy, full, and interesting life in place of a mere existence without interest, without pleasure, and without hope.

COMMENTS ON THE TREATMENT OF ECLAMPSIA.

In *Medicine and Surgery* for August, 1917, HOLMES says that a summary of recent opinion on the treatment of eclampsia may be stated as follows: Chloral hydrate 15 grains, with morphia ¼ grain. Thereafter the two drugs are exhibited as often as the condition of the patient requires, this depending on the time the effects of the drugs wear off, or on the evidence of recurring aggravation of symptoms. At the same time, such methods are instituted as will tend to secure elimination (catharsis, diaphoresis, and diuresis). When the condition of the parturient canal permits it, then operative delivery should be accomplished. No chloroform should be given; oxygen should be given during the convulsion. How popular the expectant, nonsurgical treatment of eclampsis will become, time alone will tell. However, it will have one beneficent influence in drawing attention to the fact that operative intervention is ***not the treatment,*** but is merely an incidental detail in what we now know as the treatment.

After all is said and done, at the present time, the therapy of eclampsia is a system of blindly groping in the dark.

THE MODE OF EXISTENCE OF FLIES DURING WINTER.

MCDONNELL and EASTWOOD (*Journal of the Royal Army Medical Corps,* July, 1917) alluding to the fact that most investigators maintain that flies in their fully developed form are hibernating insects, state that careful search has failed to corroborate this theory. The authors believe that eggs which are deposited in manure and refuse dumps in late autumn are the sources from which the yearly "plague of flies" originates, and that the hatched-out larvæ in a dormant state persist throughout the winter and come to the surface in the spring or early summer.

They therefore made a careful investigation of the manure dumps and disused trench latrines. They found in March after a very severe winter that in a heap of old manure living larvæ were found at a depth of three feet. This heap was covered with grass and weeds. Larvæ were also found in human excreta dropped and covered with six inches of earth the preceding autumn, and in similar material covered with two feet of earth. Pupæ which in the larval state had evidently migrated from the manure and excreta heaps were found about two feet from the respective dumps lying at a depth of about one inch below the ground surface. The larvæ were placed under favoring experimental conditions and afterward became fully developed flies.

Larvæ found at a depth of two feet in a manure heap were apparently dead, but revived when exposed to heat; evidently they were hibernating.

These preliminary observations open up a new field of investigation and indicate the

inadequacy of the present hypothesis that the summer "plague of flies" is mainly dependent upon the survival throughout the winter of the adult fly in some suitable nook or cranny.

It would appear that the fly either passes the winter in the pupal stage as do many insects, or that fly larvæ may even have the power of undergoing hibernation with intervals for feeding during the spells of warmer weather. It is known that fly larvæ do not mature for probably several weeks when fermentation of their food supply does not take place. It will be seen, then, that manure heaps will be a source of danger at any time of year, and if the spread of flies is to be prevented, manure should either be burnt, or spread out in thin layers; dumping in the immediate vicinity of camps and buildings should be avoided. Covering over the heaps with earth, or sowing the surface with grass or other seeds, would appear to be of doubtful value once eggs are deposited in the manure.

ANESTHETICS AT A CASUALTY CLEARING STATION.

MARSHALL (*Proceedings of the Royal Society of Medicine,* May, 1917) notes that surgical operations performed at a clearing station are for the most part urgent. It is often imperative to operate on men within a few hours of their injury while they are still suffering from the effects of shock and hemorrhage. The patients have had to travel some miles from the line by motor ambulance over indifferent roads, and many have been exposed to cold and wet. A correct choice of anesthetic is of the first importance: the patient's life will be as much imperiled by faulty judgment on the part of the anesthetist as by a wrong decision on the part of the surgeon. There are other cases in which the condition is rendered grave by sepsis, especially gas gangrene; but there remains the majority whose wounds are slight and whose general condition is good.

The methods of anesthesia the author has employed are: Ether and chloroform by the open method; ether and chloroform by Shipway's warm vapor apparatus; intravenous ether; spinal anesthesia with stovaine; nitrous oxide and oxygen; local infiltration with novocaine, etc.

The patients have not been prepared for an anesthetic, so that when brought into the theater the bowel is full and often the stomach as well. In winter months difficulty is further increased by the prevalence of bronchitis. A large proportion of the men have cough with expectoration. Autopsies on men who have died of wounds, even when they have had no anesthetic, commonly show the lung tissue to be congested, while there is excess of secretion in the tubes. In spite of these conditions, the lightly wounded are good subjects for anesthesia. They are for the most part young and healthy; they are placid, and have little fear of operation.

The work of a clearing station comes in rushes, so that for slight cases the main considerations are safety, speed, and convenience. The ideal anesthetic is one with which induction is rapid, and recovery complete a few minutes after operation, so that the patient is in fit condition for early evacuation by ambulance train. Apparatus is subjected to much wear and tear, so it should not be complicated or delicate.

Of the anesthetics the writer has used, gas and oxygen meets these requirements best. Its only drawbacks are that the apparatus is somewhat cumbersome and the materials costly. Local anesthesia can only be employed in a small number of cases on account of the multiplicity of wounds and their lacerated and soiled condition. Ether remains the most generally used anesthetic. The great majority of slight cases are anesthetized by Shipway's warm vapor method. For induction the mixed vapors of ether and chloroform are used; the process is free from struggling, so that it is seldom necessary for an assistant to stand by the patient. It is rapid: in a hundred cases which were timed induction was invariably complete in five min-

utes. Anesthesia is maintained with ether alone. There is an absence of secretion, and atropine is not given unless the patient has signs of bronchitis. Consciousness is regained quickly, and vomiting has occurred in only 26 per cent of all cases, including abdominal cases. Since the warm vapor method was introduced in this clearing station last winter, the drop-bottle has passed out of use. Compared with the open method there is a saving of at least 60 per cent of ether. There is much less diffusion of the anesthetic into the atmosphere of the theater. This is an important consideration to those working in it at times of sustained pressure.

In choosing an anesthetic for the more seriously wounded, the one overwhelming factor is safety. A method is required which will not be harmful to a patient suffering from the shock of injury, and one which will minimize the shock of operation. It has been urged that spinal anesthesia would meet these requirements and would therefore be of great value in military surgery. For men wounded in the lower extremities the author found it a convenient and satisfactory method at a base hospital; cases of profound collapse did not occur. The same good results were obtained at a clearing station in all patients who had been wounded not less than forty hours before operation. Of the more recently wounded, however, more than half showed signs of cerebral anemia with great fall of blood-pressure shortly after intrathecal injection of stovaine. It has been stated that collapse during spinal anesthesia is not dangerous. The writer has seen two cases in which it proved fatal, and has heard of a number of similar fatalities in recently wounded men.

It is to the man whose wounds are less than forty hours old, and who has lost blood, that spinal anesthesia is dangerous. This is shown by an analysis of fifty consecutive cases of wounds of the lower extremities operated on at a clearing station under stovaine spinal anesthesia. The drug was used in 5-per-cent solution, in most cases with glucose. A dose of 1 to 2 Cc. was given; when smaller doses were used anesthesia was incomplete, or came on so slowly as to make the method impracticable at a clearing station. During injection the patient was placed in either the Barker or sitting position, head and shoulders were kept high for the first fifteen minutes, and then horizontal.

Of the recently wounded patients, by no means all collapse under spinal anesthesia. It is important that one should be able to recognize beforehand which cases will tolerate this procedure. Is there any physical sign which will prove a reliable guide? The appearance of the patient is of little assistance, the pulse-rate and blood-pressure do not help us at all. A valuable indication is obtained by determining the concentration of the blood. The method the author employs is to estimate the percentage of hemoglobin in the patient's blood by means of a Haldane hemoglobinometer. This method is simple, sufficiently accurate, and only takes a few minutes to complete. A low percentage of hemoglobin, *i.e.*, dilute blood, in a man recently wounded, may be taken to mean that he has lost blood. Control observations on healthy unwounded soldiers showed the normal range of hemoglobin to be from 97 to 120 per cent, with an average of about 110 per cent, as against the author's standard indicator. In his practice he finds that if a recently wounded man has a hemoglobin percentage of over 100, it is safe to administer stovaine intrathecally. If the reading is below 100 per cent he will almost certainly show a serious fall of blood-pressure and symptoms of collapse. In these fifty cases the hemoglobin percentage, blood-pressure, and pulse-rate were recorded before the injection of stovaine. After injection, blood-pressure and pulse-rate were registered at intervals of about two and a half minutes for less than fifty minutes. The blood-pressure was estimated by means of a Riva Rocci sphymomanometer with stethoscope over the brachial artery.

As regards the appearance of the patient,

some were obviously pale, but many were not, although estimation of the hemoglobin showed their blood to be dilute. These patients suffered collapse as profound as those in whom loss of blood was obvious clinically. The deduction he would draw from these observations is that stovaine should not be administered intrathecally to men who have been wounded less than forty hours, unless it has been demonstrated that their blood is of normal concentration.

The dose of stovaine varied from 0.05 to 0.1 grm., and within these limits fall of blood-pressure was not proportional to dose of drug. Some of the greatest falls of pressure were associated with the smallest doses of stovaine, and *vice versa*. Nor was the fall of blood-pressure proportional to the level of anesthesia.

As regards prevention or combat of the collapse, the most important factor is position of the patient. Fifteen minutes after injection the head should be lowered, and it should be kept low for at least an hour. The practice of propping the patient up on his return to bed is dangerous. One patient in this series, who had no alarming symptoms when in the operating theater, was propped up on his return to the ward. He became blanched, pulseless, and unconscious. He recovered when the head was lowered, the legs raised, and pressure put on the abdomen. Another patient, whose head and shoulders were raised on his return to the ward, died straightway.

Subcutaneous injection of strychnine appears to be without value, both as a preliminary measure to prevent collapse and subsequently in its treatment. Intramuscular injection of pituitrin proved useless in combating the fall of blood-pressure. Intravenous saline caused temporary improvement in the one case in which it was tried, but the blood-pressure fell again after one and a half hours, and the patient died. This last case was a man with a penetrating wound of the abdomen. The writer's experience of spinal anesthesia for these cases has been limited and unfortunate. Three men with penetrating wounds of the abdomen were each given 0.07 grm. of stovaine. In each case the injection was followed by a great fall of blood-pressure, and death within a few hours.

Many cases are brought in suffering from shock. The wounds are recent, and one or more of the limbs are shattered. The face is pale, and the pulse flickering or imperceptible; there is a low surface temperature. If put to bed and surrounded with hot bottles his condition usually improves. The blood-pressure is taken every hour, and, if it is rising, operation is delayed. This delay must not be too long, or gas gangrene will supervene. The surgeon may be compelled to amputate a limb, and the anesthetist is faced with a pulseless patient who has to undergo a brief but severe operation. The lives of many of these patients may be saved if correct procedure be followed. In the first place morphia should be withheld before operation, or given only in small doses. A recently injured man is particularly susceptible to further shock, and this susceptibility is greatly increased by large doses of morphia. If chloroform be used, the patient is likely to die on the table. With ether the patient's condition actually improves during operation, but he will collapse an hour or two afterward. If the ether be given intravenously, the patient's condition improves strikingly during administration, but there is profound collapse, which is often fatal within the next two hours. The cause of death is not edema of the lungs. In several cases there was edema of the liver, and in one patient who died an hour and a half after intravenous ether the gut was edematous from stomach to rectum.

Incomparably good results are obtained with gas and oxygen, and no other anesthetic should be used for this type of case. Anesthesia may be so light that the patient will move when nerves are resected. There is practically no evidence of shock from the operation, even when this is an amputation through the upper part of the thigh. In few of these cases has the blood-pressure

fallen 15 mm., or the pulse-rate risen more than ten beats per minute. The patient is fully conscious five minutes after operation, and can literally "sit up and take nourishment." There is no collapse during the next few hours, and the subsequent progress is notably good.

Early sepsis usually takes the form of gas gangrene. In a typical case the patient vomits repeatedly, his face is of a pale muddy color, his pulse feeble and running. In spite of this apparently desperate condition, such a patient is a much more favorable subject for anesthesia than one who is suffering from shock.

Intrathecal stovaine, which causes collapse in the recently wounded man, has no such effect on this same man some days later, although sepsis may have rendered his general condition much more serious. This same distinction is seen with ether anesthesia, whether the ether be given intravenously or by inhalation. The collapse which occurs after operation on a man who is suffering from shock or recent hemorrhage is not seen in these later and septic cases. Some of the most brilliant results have been obtained with intravenous ether; the improvement in the patient's condition, which occurs during administration, is maintained afterwards, and vomiting seldom recurs.

Gas and oxygen also give excellent results. Chloroform is to be avoided: if this drug be used the man's blood-pressure will fall after operation, and he is likely to die within the next twelve hours.

There is now general agreement that chloroform is a bad anesthetic for head cases. Operation may be performed under local anesthesia; all tissues of the scalp are infiltrated in a circle widely surrounding the site of incision, with a .02-per-cent solution of novocaine with adrenalin. No pain is felt even when bone or dura is dealt with. On the other hand, the forcible cutting of bone is disturbing to the patient, so that where mentality is unimpaired general anesthesia is preferable. Warm ether vapor is exceedingly satisfactory. The vapor is given by means of a catheter passed down the more patent of the two nostrils; thus the mask is dispensed with and the surgeon has a clear field. The ether is vaporized by passing oxygen through it. Breathing is easy and noiseless and there is no congestion, whatever the position of the patient's head, so that hemorrhage is not unduly provoked.

Men with abdominal wounds are particularly liable to develop bronchitis, perhaps owing to the deficient movement of the lower part of the chest. With open ether 54 per cent of abdominal cases had bronchitis after operation. With warm ether vapor the percentage dropped to 14.7. These figures were obtained from two comparable series occurring in the same months of two successive years; only those cases were counted which survived operation more than forty-eight hours.

Exposure of gut outside the abdominal cavity produces a more serious effect on the patient. If more than 2 or 3 feet of gut are so exposed, after a few minutes the blood-pressure commences to fall rapidly and it continues falling until the gut is returned to the abdomen. This effect is seen when the stomach and omentum are exposed, and even with the great omentum alone. The covering of exposed viscera with pads soaked with hot saline does not prevent this effect on the patient's condition. Nevertheless it seems probable that the cause is heat-loss from exposed blood-vessels.

Surgeons should be urged to make large incisions and work as much as possible with the gut lying inside the peritoneal cavity.

Apart from copious hemorrhage there is one other procedure which causes rapid fall of blood-pressure during abdominal operations. This is turning the patient on his side. The effect is produced only if the patient has been under the anesthetic for a considerable time before being turned. At the end of an abdominal operation the patient may be in good condition; he is then turned on the right or left side, in order that the surgeon may excise a wound

in the back. In a few minutes there is a great fall of blood-pressure and the radial pulse disappears. It may be hours before the patient recovers this lost ground. The indication is that wounds of the back should be dealt with before laparotomy, as turning the patient has no ill effect during the first half-hour of an ether anesthesia.

There is one type of abdominal case for which chloroform has advantages—this is the man who has a penetrating wound of the chest as well as of the abdomen. Here ether cannot be used, as it will, in the majority of cases, provoke fatal intrathoracic hemorrhage. To these patients the writer now gives hyoscine 1/100 grain, atropine 1/100 grain, and morphia 1/6 grain, forty minutes before operation. This is followed by a minimal amount of warm chloroform vapor with oxygen. With this sequence the recovery rate has greatly improved in the chest-abdomen cases, while in the men who died there was no evidence of fresh bleeding into the chest.

With regard to fluids, it has been the author's practice to give three pints of normal saline subcutaneously during operation. For the collapsed cases this seems to be useless; they do not absorb the fluid. Autopsies on men who have died as late as thirty hours after operation have shown the bulk of the fluid to be still in the subcutaneous tissues near the site of injection. To these collapsed patients he gives saline intravenously, toward the end of operation. Only a very temporary effect is produced on the blood-pressure if transfusion is completed in the early stages of operation.

THE ANTISEPTIC PROPERTIES OF ACRIFLAVINE AND PROFLAVINE AND BRILLIANT GREEN.

GULBRANSEN and THORNTON (*British Medical Journal,* July 21, 1917) present a report to the Medical Research Committee embracing results of an intensive study of these substances. They summarize their findings as follows:

Flavine compounds and brilliant green are antiseptics which exert a slowly progressive bactericidal action. Concentrations of these substances, which at first inhibit and finally kill bacteria, are without harmful effect on phagocytosis or on the tissues locally or generally; hence they are especially suited for therapeutic purposes in infected wounds. Flavine compounds may be applied to the peritoneum with safety.

Flavine compounds (acriflavine and proflavine) are enhanced in their bactericidal potency by the presence of serum; brilliant green, in common with most other antiseptics, is reduced in its activity by serum.

The most suitable method of application of an antiseptic for therapeutic purposes must depend very greatly on its behavior in the presence of serum. When the antiseptic is inactivated by serum, frequent renewal of the watery solution is indicated, as in Carrel's procedure; this, of course, is only permissible provided that the substance is not in itself toxic.

Brilliant green satisfies the requirements for application by repeated irrigation, as a powerfully bactericidal solution (1:200) in water is practically innocuous to the tissues. On the other hand, since flavine compounds are most bactericidal in serum, the indication is to arrange the wound dressing so that these antiseptics may act in a serum medium; also, since these bodies are not rapidly thrown out of action by serum, accumulative deposit should be prevented by avoiding too frequent additions of considerable quantities of the antiseptic solution. Clinical experiences have substantiated these conclusions, and the evidence at disposal points to the application of flavine bodies by means of gauze packing or some appropriate modification of this procedure as likely to yield the best results. Thus there is evidence that, by taking full advantage of the properties of flavine bodies, a relatively simple technique may be followed.

The application of the flavine compounds, especially for the purpose of preventing the

onset of septic manifestations, in early wounds is emphasized; also their use for preventing exacerbations after operating in areas already infected.

Operative measures are an essential preliminary to the effective use of therapeutic antiseptics in wounds, since the antiseptic can act only when brought into intimate contact with the infected tissues.

OBSERVATIONS ON GAS BACILLUS IN FRANCE.

JUDD (*Surgery, Gynecology and Obstetrics,* August, 1917) after alluding to the mud and dust of the trenches and the circumstance that the clothing is always heavily infected, noted that the rifle ball fired from a distance and entering the tissues by its point creates usually an aseptic wound. That pieces of shell invariably caused infected wounds, the latter as a rule carrying in portions of garments. Moreover, the wound of entrance may be very small. The perfringens is the usual gas-forming bacillus, associated with other organisms both anaerobic and aerobic. The vitality, virulence, and power of penetration of the anaerobes is remarkable. No matter what antiseptic is used the anaerobe will be found as long as there is dead tissue in the wound. Streptococcus is found in nearly all infected wounds at some period of their evolution. It is generally recognized as an enterococcus, a regular inhabitant of the intestinal tract. Staphylococcus is also fairly frequent, as is the bacillus proteus and bacillus pyocyaneus in the later stages of wound.

A description of the phenomena of war wounds by Policard and Philip is usually accepted as correct:

Up to the fifth hour after the receipt of the wound no reaction manifests itself. Microscopic examination shows the presence of blood-clots enclosing fibers of cloth, débris of the surrounding tissues, connective tissue fibers torn, nuclei more or less altered, muscular fibers traumatized but no infiltration of leucocytes.

From the fifth to the ninth hour commences the reaction of the tissues. Migrating elements appear, the polynuclear neutrophiles, large mononuclear and small lymphocytes. This reaction of healthy tissues shows signs of degeneration.

From the ninth to the twelfth hour, approximately, the appearance of bacteria is noted: large club-shaped organisms, Gram-positive, classified as bacillus perfringens or bacillus aerogenes capsulatus. These bacilli commence to appear in the immediate neighborhood of the cloth fibers and grow in the blood coagula which enclose them.

After about the twelfth hour three phenomena dependent one on the other are evolved simultaneously: The bacilli multiply and spread out farther from the cloth fibers. There is a production of polynuclear neutrophiles, of which a small number perform the function of phagocytes; the reaction of defense of the tissues is clearly insufficient. The leucocytes are altered and are transformed by degeneration into globules of pus, but as the production of leucocytes is limited the pus is not abundant.

These phenomena continue slowly at first, but are accelerated from the twentieth to the thirty-sixth hour, at which time the pus is fetid. Almost always at the forty-eighth hour the anaerobes are associated with aerobic organisms which favor their development by absorbing the oxygen of the media in which they are growing.

In general gas infection is an early symptom. It may appear in the first few hours after the receipt of injury and usually is seen in the first few days. Chalier has illustrated by a diagram the date of appearance of gas infection in his cases. The late appearance of gas infection should be noted. This may be produced by the ligation of a vessel for secondary hemorrhage, the diminution of the blood supply allowing a flare-up of the infection. It may follow a reamputation or show itself in other cases difficult to explain.

Wounds of the thighs and buttocks are most apt to be soiled by mud and dejecta, and are consequently more apt to become

infected. Tuffier has stated that he has not noted a case of gas gangrene of wounds of the scalp, skull, or brain, of the face, jaws, or neck, and exceptionally has he observed it in wounds of the thorax. Brodier, however, has reported a fatal case of gas gangrene of the scalp.

After a period varying from twelve hours to several days, the manifestations of a specific infection show themselves by pain, swelling, and tension of the wound, changes in the pulse and the mental condition. The subjective symptom of pain is most important and may be considered as a signal symptom. When a wounded man who has had his wound dressed and has been made comfortable complains that the dressing is too tight, it is well to take down the dressing and examine the wound. Palpation of the tissues shows increased tension and sometimes gas crepitation, but this is not usually felt at an early stage. The swelling is limited to the region of the wound or to the entire limb, and is caused by the edema and later by gas, and manifests itself as an edematous or gaseous form according to the preponderance of one over the other. Rapidity of the pulse with or without irregularity is apt to be an early symptom. Changes in the mental state show themselves by a dulled, resigned, somewhat apathetic condition which may be noted in the early stages.

The wound discharges a thin, brownish pus, and pressure may expel some gas. Discoloration of the skin shows itself in various hues varying from a porcelain appearance to black. These modifications of color show themselves around the wound or in irregular patches along the limb, the vesicles appearing suddenly, but are often not present.

The presence of gas varies in intensity and is shown by percussion giving a tympanitic note, and palpation reveals no crepitation. A razor moved over the skin gives a special tone, noted by J. Quenu. The gas spreads rapidly up and down, following the vascular tracts to the axilla or groin, where it may form air-pockets. In some cases it is arrested at Poupart's ligament. The extension is rapid at times, in two or three hours signs of putrefaction being seen.

The odor, a late symptom, is the ammoniacal or fetid one of decaying flesh.

The pulse is a symptom of great importance, and its character and rapidity are good indications of the condition and gravity of the case. The face has a leaden or subicteric hue, sometimes icteric. The mental condition is one of torpor, which varies with periods of agitation. The mind may be remarkably clear and tranquil at the end, and a soldier has even been known to ask for and smoke a cigarette an hour before death.

There is a mild or superficial form, and a severe or deep form.

Under the mild forms are recognized the cutaneous and subcutaneous varieties. The cutaneous form, not dangerous, shows itself as an edematous zone around the wound with crepitation present and sometimes bronzing of the skin. Improvement is to be expected in a few days. A second superficial form called "malignant white erysipelas" has been described. This form is characterized by a white porcelain-like appearance of the skin, slight formation of gas, and marked edema. The subcutaneous form is the "gaseous phlegmon or cellulitis." In this variety the infection is limited to the subcutaneous tissue and manifests itself by a zone of crepitation limited to the cellular tissue and shows no tendency to infiltrate the deeper parts.

The severe or deep cases are characterized by edema, and extensive gas formation spreading from a deep origin of muscular infection. Severe general symptoms develop, the limb goes on to gangrene, and the patient to death unless intervention is successful.

According to the predominance of symptoms among the severe cases have been distinguished "gas septicemia" caused by the vibrion septique of Pasteur and "malignant gaseous edema" dependent on a special anaerobe of Sacquepee. The first form is

characterized by extensive gas infiltration, diffuse muscle gangrene, moderate and limited edema. In the latter form the edema predominates, the area of muscular gangrene is circumscribed, and the gas is less evident. The early diagnosis is of the utmost importance, as a few hours' hesitation is often fatal. The early discharge of thin, brownish fluid from the wound should be noted, and, in case of doubt, an incision should always be made. When crepitation is present the diagnosis is easy and can only be confused with a few conditions.

A superficial infection or a deep infection receiving proper treatment in reasonable time yields good hopes of recovery. The mortality is high in the deep forms, and one can more often predict a fatal result in severe forms than a recovery. The edematous forms have a worse prognosis than the gas forms. The so-called "white erysipelas" has a bad prognosis: almost certain death without amputation, 25 per cent recovery with amputation. Diffuse forms or cases in which the spots multiply rapidly offer little hope. Dyspnea, icterus, and small, rapid pulse are bad symptoms. Mortality records would probably vary from 10 to 50 per cent.

It is noticeable that many more cases of gas infection are seen after heavy attacks when the wounded are transported in large numbers. This may be explained by the relatively longer period of time spent on the battle-field after being wounded than in times of comparative inactivity. Also the vast numbers of wounded overcrowd the service and individuals do not receive the attention that they do at other times. It has not been infrequent at these times of great activity for masked cases of infection to develop on the trains, and for these patients to arrive at their destination in a moribund condition.

As to treatment, it is noted that before an attack soldiers are instructed to put on clean undergarments as far as possible. The first-aid packet and iodine ampules have proved a failure as far as preventing infections in shell wounds. The dressing is too small for many of the wounds and the amount of iodine entirely inadequate. Also the fragment of shell and piece of cloth are carried into the wound and infect it and remain there beyond reach of these measures. For rifle wounds the first-aid packet is undoubtedly useful.

Preventive vaccinotherapy has been attempted, but the results thus far have not been sufficient to establish confidence in this measure. Wright has prepared an antigangrenous vaccine to be used in mixed infections. Weinberg and Seguin have prepared an auto-pyo-vaccine. These measures to be at all successful must be practiced as early as possible after receipt of the wound.

A certain number of cases of this infection are inevitable, especially when the number of wounded is very large. Early intervention in the first twelve hours is of the utmost importance in preventing manifestations. This intervention should be guided in its extent by the *x*-ray. It should consist in the excision of all damaged tissue and accurate hemostasis. In addition the wound should be disinfected. Best results have been obtained by the use of Dakin's solution according to Carrel's method. Isolation of gas gangrene cases is desirable. When the condition is definitely established the French pour ether into the wound and lightly pack with gauze, which is moistened with ether several times a day and covered with some impermeable material. Quenu recommends hot air at 800° for bad cases and claims good results. Willems gives air, sunlight, and free incisions and constant continuous irrigations of 3- to 10-per-cent salt solution. The most constantly good results have been obtained by Carrel's method and the use of Dakin's solution.

Kenneth Taylor has recommended the use of quinine hydrochloride for gas infection cases, either in the form of wet dressings or as a continuous drip. For the former a one-per-cent solution is used, and for the continuous irrigation one-tenth of one-per-cent solution, made up with saline solution or plain water. Injection of

hydrogen dioxide has been abandoned. The large number of antiseptics used proves the inefficiency of any of them. To have success amputation must be decided on while there is a chance of getting good results. The best stimulant is said to be hot saline solution given by hypodermoclysis. Gas and oxygen is the anesthetic of choice. It is the present custom to divide all the tissues at the same level, leaving the wound wide open.

GLUE FOR APPLYING EXTENSION IN FRACTURES.

The *British Medical Journal* of July 14, 1917, publishes in response to many inquiries SINCLAIR'S formula for the making of a glue and for its application to the extension required in compound fractures of the lower limb. The formula in general use is as follows:

Ordinary glue, 50 parts.
Water, 50 parts.
Glycerin, 2 parts.
Calcium chloride, 2 parts.
Thymol, 1 part.

The glycerin and calcium chloride are both deliquescent and take up the perspiration, which keeps the glue from getting brittle, and, more important still, allows perspiration to take place. This prevents the skin from getting sodden, in which condition bacteria may flourish and give rise to skin troubles. The thymol is added to prevent putrefaction and diminish smell. Every time the adhesive is heated the odor gets less and less. Experiments have proved that bacteria do not grow on this preparation. Air-tight tins which hold about a pound are filled and sterilized at 100° and placed in store. When required the contents are melted in a water-bath, and set aside a few minutes to cool.

The adhesive is applied with the palm of the hand or a brush. The skin is washed with soap and sodium carbonate solution (four drachms to the pint) in order to remove fat, and when dry the adhesive is applied without shaving the part. The area is covered evenly, and the ordinary four-ply gauze as it comes out of the packet applied, having roughly measured the requirements and gathered it in at the level of the wrist or ankle. An alternative method is to put on a length of "elastic cotton net bandage" (S. Maw) from knee to ankle, to glue it on the outside, and then to apply the gauze as above and bandage carefully with a thin bandage.

The gauze, being spread out fan-shaped, adapts itself to the conformity of the limb, and is kept in apposition with the skin by a loose woven bandage. The extension can be made almost immediately.

The above method of extension is a very great saving of time, and when compared with the cost of good strapping is as sixpence to three shillings a limb. The following slight modification in the formula gives an excellent adhesive which is a little more elastic:

Isinglass, 50 parts.
Glue, 50 parts.
Water, 50 parts.
Calcium chloride, 2 parts.
Tannic acid, 12 parts.
Thymol, 1 part.
Glycerin, 2 parts.

SHOCK.

MCDONAGH (*Practitioner,* July, 1917) regards shock as a condition which may be due to trauma, narcosis, hemorrhage, or an intravenous injection of colloid. Recently shock has received another name, nitritoid crisis. The word anaphylaxie was used by a French physician, Richet, who found that, from the tentacles of the sea-anemone, a toxin could be prepared which caused intense vascular congestion in the viscera of dogs, leading to death after some hours. He found too that if the dose given was too small to kill the animal, a second dose of only one-twentieth the amount of the first produced serious symptoms which resulted in death. It was necessary, however, that a certain minimum number of days, eight to twelve, should elapse between the two injections. When the second injection was given three or four days after the

first, severe symptoms did not follow. Von Pirquet called certain analogous phenomena allergy. This condition is often termed by the English hypersensitiveness. It was at first thought that only proteins would produce shock, but symptoms exactly like those caused by even a non-toxic protein, such as egg-albumen, can be brought about by the intravenous administration of aluminum hydroxide to rabbits, and of salvarsan to man.

The one necessary characteristic of the substance which is to produce what is commonly called anaphylactic shock is that it shall be a colloid. Here then is the first indication of the connection between shock and immunity. Substances to produce shock must be in a colloid state, and so must antigens, antibodies, etc. Symptoms vary with different animals according to the particular organ which is most affected, but however symptoms may differ the modus operandi is the same in every case.

Another point about the shock-producing substance is, that it may be specific. The specificity is not absolute.

Aluminum hydroxide as a suspension colloid, and only as such, produces shock, and acts as an amboceptor in a hemolytic system. With glycerin, gelatin, or albumen, it is an emulsion colloid; consequently, as an emulsion colloid, it is not precipitated, and the electrolytes of the lipoid-protein particles are not disturbed. As a suspensoid, aluminum hydroxide is readily precipitated even by univalent ions, such as those of sodium chloride; in which case the balance between the absorbed and non-absorbed electrolytes of the lipoid-globulin particles will be changed. This results in an upsetting of the balance between the hydrogen ion and hydroxyl ion concentration of the serum; consequently the patient dies. A disturbance of the normal hydrogen ion concentration of the external phase quickly leads to an upset of the oxidase-reducase system of the internal phase. Calcium chloride increases the stability of the permeability of the lipoid-globulin particles; wherefore, if aluminum hydroxide is injected later as a suspensoid, electrolytic dissociation of the ions of the lipoid globulin particles does not occur.

The shock-action of aluminum hydroxide is due, primarily, to its strong positive electric charge. So far as inorganic colloids are concerned, specificity takes no part. Specificity depends upon the amino-groups, therefore it will be seen that the shock produced by proteins is due to the amino-groups, because if these groups are in any way destroyed shock will not result.

For protein to produce shock it must not be fresh, but must have been deprived of some of its electrolytes; hence, when it is injected, provided its amino-groups have the same stereo-chemical molecular configuration as those in the lipoid-globulin particles of the serum, absorption will occur.

The rapidity with which the animal dies clearly shows that shock is not due to an enzyme producing protein digestion. Anaphylactic shock occurs from the intravenous injection of any colloid, and it may occur after salvarsan and its substitution products. It occurs more often in the early than in the late stages of syphilis, more frequently after the fourth and the subsequent injections than after the first three, if the interval between the injections is more than ten days and if the patient has had a meal just before injection. A few minutes after the injection a patient may become faint, vomit, and then lapse into unconsciousness, with a failing heart, which may ultimately cease to beat; or he may become deeply cyanosed, with swollen lips and tongue and a true picture of asphyxia, due to a tetanic contraction of the smooth muscle fibers of the small bronchi; when the tetanic contraction ceases the patient regains consciousness. In the first case, as soon as the patient regains consciousness he begins to complain of excruciating pains in the legs and feet, but gets well in a short time. Some cases are followed by typical arsenical dermatitis.

Shock may occur in any individual and is more likely to be noted in those perfectly

healthy than in chronic alcoholics. In most cases the kidneys are perfectly normal. Asthma may be a symptom of chronic shock. Urticaria pigmentosa is probably always indicative of this condition. In acute shock complement vanishes altogether. In chronic shock it is partly destroyed. Complement represents the balance between the hydroxyl and hydrogen ion concentration of the serum; in acute shock we know the balance is upset.

In any infection, acute or chronic, if the protective capacity of the host's cells is stimulated to its utmost point, then eosinophile cells and mast cells usually make their appearance.

These are rich in oxidases and reducases which regulate the hydrogen ion concentration. The oxidase-reducase system corresponds to the phosphate and bicarbonate systems, which maintain the constant hydrogen ion concentration of the fluid part, in which the "solid" particles are in "solution."

Friedberger and Hartoch found that acute shock could be avoided by injecting intravenously an hypertonic solution of sodium chloride. Shock can be increased by the injection of phosphates, particularly the glycerophosphates of calcium. The author states that he has had three cases of hay-fever in which salvarsan wrought a cure for the ensuing summer. Salvarsan, owing to the arsenic it contains, would tend to increase the hydrogen ion concentration. If so, it would counteract the effects produced by an increase of the hydroxyl ion concentration.

A characteristic feature of all shock conditions is vasodilatation. The primary change is an alteration of the permeability of the lipoid-globulin particles in the serum. The vasodilatation is primarily of peripheral origin, as is shown by the fact that adrenalin, a drug which acts centrally, is not so useful in shock as chloride of barium, which acts peripherally on smooth muscle fibers and causes an instantaneous rise of pressure.

The therapeutic action of a colloid is mainly dependent upon (1) character—*i.e.*, whether it is an emulsoid or a suspensoid; (2) atomic or molecular weight.

Colloids are usually divided into two classes: (1) emulsoid; and (2) suspensoid; the main difference between the two being dependent in part upon the presence or absence of amino-groups—that is to say, a colloid which behaves, when injected into the body as an emulsion colloid, has, in most instances, amino-groups in its molecular constitution, or absorbed to it. Emulsion colloids have a greater therapeutic action than suspension colloids, because owing to their amino-groups their surface action is greater.

The complex emulsion colloids are proteins. The proteins are more complex in fungous than in bacterial diseases, and still more so in protozoal diseases. Proteins are widely used in vaccines, and reactions from the injection of proteins may be avoided by adding serum to the bacterial emulsions, preferably a specific antiserum. This process is generally called a sensitization. Proteins will not readily produce shock *de novo;* the body must have prepared a resisting substance against each individual protein first. Consequently, shock, at first sight, appears to be specific.

As to the prevention of shock, the treatment of the case will naturally depend upon whether the patient has a pulmonary or a cardiac attack.

In a pulmonary case, atropine must be injected; giving oxygen to inhale; or the usual methods for producing artificial respiration may be tried; but as a rule they are useless. In a cardiac case the patient should immediately have his head and thorax lowered, injections of ether, camphor, and strychnine should be given, oxygen should be inhaled, and artificial respiration instituted. Heat to the heart region should be applied, and brandy should be taken by the patient if possible.

In both the cardiac and the pulmonary cases, pituitary extract or adrenalin should be used. The former is better than the latter, but neither of these drugs will be of

great service unless they are injected before the administration of the drug which caused the shock. Injecting pituitrin as a routine procedure is impracticable. The action of pituitrin and adrenalin is to cause vasoconstriction of the capillaries, and thus they prevent the vasodilatation which is an accompaniment of shock, although not the main feature. Their action is, therefore, only an indirect one. As the direct cause of shock is an upset of the normal hydrogen ion concentration, which changes the colloidal character of the protein particles, and results in the patient getting insufficient oxygen, the obvious procedure to adopt is to increase the stability of the permeability of the protein particles, and thus prevent the oxidase-reducase system from becoming deranged. Calcium chloride will do this; therefore, in every case of shock, 10.0 Cc. of a 2.5-per-cent solution of calcium chloride should be injected intravenously, and the patient's life will be saved if the injection be administered quickly enough. It is a good plan to make the solution isotonic with glucose, and to add gelatin; consequently the writer now uses 10.0 Cc. ampoules containing calcium chloride 5 per cent, glucose 15 per cent, and gelatin 3 per cent. As this mixture forms a jelly, it must be heated and diluted up to 50.0 Cc. or 100.0 Cc. before it is injected. Ampoules of 10.0 Cc. are handy, and the jelly is easily melted.

It is possible that the treatment of shock produced by drugs should differ from that produced by hemorrhage, because Hurwitz claims to have had excellent results in the latter form, by injecting a 5-per-cent solution of gum arabic in Locke's solution. Viscosity is probably a more important factor in shock produced by hemorrhage than in the form produced by drugs; even so, gelatin is preferable to gum.

Bayliss lays much stress upon the diminution of plasma in the blood taken from cases of shock. As many of the protein particles go into solution and the amount of absorbed calcium is decreased, when shock occurs obviously the plasma will be diminished and the viscosity of the blood altered. The diminution of plasma gave rise to the idea that cases of shock should be treated with an artificial serum, but it is extremely doubtful whether one could be prepared which would prove more efficacious than the calcium chloride-gelatin-glucose mixture.

In cases of acute, subacute, and chronic shock produced by one drug, the condition can be remedied immediately by giving another drug which has an opposite charge. In cases of mercurialism, plumbism, and arsenical poisoning, intramine and iodine should be prescribed, and *vice versa*.

It must not be forgotten that although shock is due to an upset of the normal ion concentration, there are several other etiological factors of a secondary nature. Some people are more liable to shock than others; fear may predispose thereto, so may a heavy meal just before injection, etc.

If a patient dies under an anesthetic, death is usually ascribed to status lymphaticus. Many of the deaths are ordinary cases of cardiac shock. The author thinks that status lymphaticus is a toxic condition which renders the patient more liable to shock. If this is the case, then the status lymphaticus is not the cause of the shock or death. It is probable that the toxin is one which raises the hydrogen ion concentration.

Nitrous oxide and ether, as shown by Crile, increase the hydrogen ion concentration of the blood—presumably chloroform has the same action; therefore, in shock following an anesthetic, it might be advisable to inject a colloid which raises the hydroxyl ion concentration, such as colloidal iodine or intramine. It is a well-known fact that shock following chloroform can be prevented by using ether first, but the explanation is probably not so well known. Lillie (quoted from Crile) demonstrated that the addition of ether to the sea-water, in which arsenicola are living, causes changes in the semipermeable membranes, as a result of which these membranes become less permeable to the passage of ions. Therefore, if ether is used before chloro-

form, the latter cannot exert its full power, with the result that shock is less likely to occur. The author mentions this because it fits in with what has already been said concerning the share permeability takes in the production of shock.

Taking, finally, the case of alcohol poisoning, alcoholics are more difficult to anesthetize than non-alcoholics, presumably for the same reason that ether checks the deleterious action of chloroform. One of the best remedies in alcoholism is colloidal iodine.

A NEW PHYSICAL SIGN IN PNEUMOTHORAX AND IN PLEURAL EFFUSION.

Williamson (*Lancet,* July 7, 1917) has observed this sign so frequently that he is likely to consider it valuable confirmatory evidence of either pneumothorax or pleural effusion. The sign consists in a markedly diminished blood-pressure in the leg as compared with that in the arm on the same side, a difference of 10 mm., and in many cases of over 20 mm.

In normal persons the systolic arterial blood-pressures taken simultaneously with due precautions in the arm and leg of the same side (the armlet around both limbs being at the same level) will be found to yield practically identical readings. In some pathological conditions differences will be found. Leonard Hill observed that constantly in cases of aortic incompetence. Anatomically the pleura on each side, more especially on the left, comes into relation with the descending thoracic aorta as it lies on the vertebral column, and the writer suggests that the most obvious cause is that when the pleural cavity is distended with liquid or with gas pressure upon the aorta this causes to a greater or less degree corresponding diminution in systolic pressure distally to the compressed area.

The methods of observation have been as follows: The patient has been at rest in bed, so that the armlet used for the leg reading and that for the arm have both been at the level of the heart. The Riva Rocci type of instrument was used, an Oliver's armlet of a width of 12 cm. being placed round the upper arm, and another one round the calf of the same side. Both armlets were connected by means of a three-way tube with the same pump and manometer. One observer took the systolic reading in the radial artery, the other in the dorsalis pedis or posterior tibial, and for alternate observations the two observers changed about so that the one who had previously taken the arm reading now took the foot one, and *vice versa,* the object of this procedure being to eliminate any personal equation. The readings taken were those obtained on letting the air out of the armlets after inflating them to a degree greater than necessary to obliterate the pulse in both limbs. The results are recorded in mm. of mercury.

PENETRATING WOUNDS OF THE ABDOMEN.

Armstrong (*Lancet,* July 21, 1917), based on Serbian experience, makes a plea for operation in all cases of intestinal perforation due to bullet wounds. Cases not having operative treatment were placed in the sitting Fowler position. Subcutaneous saline was given by Lane's apparatus, as much as six pints in twenty-four hours in some cases, together with pituitary extract and camphor in oil. Neither food nor fluid was given by mouth for the first three days. Hyoscine and morphia for restlessness. After preliminary stimulation operation was performed on all patients having intestinal lesion; by either right or left rectus or midline incision. Cases that recovered had no drainage tubes in the peritoneal cavity, and these should be discarded except when there is a definite localized abscess. A cigarette drain was always left down to the peritoneum. The wounds always suppurated, due to the bacillus coli. Thus a certain number of antibodies form and have a beneficial influence on the underlying general peritonitis.

Subcutaneous saline was used as an

after-treatment, the rectal method being regarded as inefficient. The author's experience is limited to ten cases. Two of them showed no intestinal perforation, and both recovered. Of ten cases with multiple perforation of the intestine of over thirty hours' duration, seven died and three recovered. Of seven cases treated more conservatively of more than thirty hours' duration, all died. One case of over thirty hours' duration, treated by the Murphy operation (quick drainage), also died. Three cases illustrating rigidity of recti due to injury of diaphragm, all recovered.

Armstrong states that hemorrhage is the most frequent cause of death in wound of the abdomen in the first hour.

Roundworm was present in two of the cases. Intermittent rigidity of the recti muscles is an important sign of an injured diaphragm. The rigidity may last for about thirty-six hours. It is not to be confounded with the rigidity of peritonitis.

HEMOLYTIC JAUNDICE.

GIFFEN (*Surgery, Gynecology and Obstetrics,* August, 1917) reports from the Mayo Clinic upon 17 patients with hemolytic jaundice. Twelve of the patients were splenectomized; five were treated medically. Of the 17 patients, seven had been jaundiced in infancy, four others since childhood, and four had an onset between the ages of eighteen and twenty-two. It is probable that in 10 of the entire series the disease should be classified as congenital in type. Three cases were definitely familial. Six others gave suggestive histories. One patient had a history of the onset of jaundice at the age of thirty-two, and another as late as forty-six years of age. The jaundice in all the cases of the series was acholuric and seems never to have completely disappeared. It was remittent rather than intermittent. In 12 of the 17 cases the spleen had been recognized as being enlarged for some time. The spleen, though large, is never enormous, as is the spleen of splenic anemia or leukemia. Two of the five non-operative cases presented evidence of enlargement of the liver. In one of these it was marked. Eight of the twelve operative cases showed enlargement of the liver at operation, and in two of these a surgical diagnosis of cirrhosis of the liver was made. The cirrhoses were of the granular rather than the lobulated type and of slight degree. The livers were not contracted. But one patient, an operative case, showed evidence of abdominal fluid; the amount of fluid was small. The liver was much congested, but a positive diagnosis of cirrhosis could not be made.

Sixteen of the seventeen patients gave a history of attacks, some very mild in character, of abdominal distress, nausea, fever, vomiting, and headache, and when gallstones were present seizures of severe pain. Usually these crises were mild in childhood and more severe in later life. In cases of short duration they were mild and not long. The most important evidence can be obtained from the history in arriving at a differential diagnosis of hemolytic jaundice from recurrences of deepening jaundice with crises.

In but two instances was the anemia severe. In most cases it was of moderate degree and chronic type. The hemoglobin in the twelve cases varied from 24 to 86 per cent, and averaged 59 per cent. In the entire group of seventeen cases the lowest erythrocyte count was 1,340,000. The color index was, as a rule, high. This uniform color index is quite definitely indicative of the myelo-toxic factor in the disease. There was a slight tendency toward leucocytosis. After splenectomy there was a prompt increase in the hemoglobin estimation and the red-cell count. Postoperative leucocytosis is not a constant finding. Although there was a relative increase in the polymorphonuclears, the reverse has been noticed in the cases of pernicious anemia after splenectomy. The condition of the blood was reported as normal in nine of ten living patients two months to nine and a half years after operation. There was decided or constant decrease of fragility of the red

cells after splenectomy. Urobilin was present in the five cases in which the urine was tested for this substance. Bile was absent in all save one, in spite of the frequency of cholelithiasis as a complication. The diagnosis of hemolytic jaundice may at times be confused with the presence of bile in the urine, but an obstructive jaundice has been superimposed upon an acholuric jaundice.

The Wassermann test was negative in 11 of 13 patients tested. Noticeably low blood-pressure was present in all of the cases except one, the systolic frequently reading below 115. In general very little loss of weight was noticed. The incidence of gall-stones in the severe types of jaundice was high. Seven of 12 operative cases (58 per cent) showed gall-stones, for which a later operation was usually done. The attacks of acholuric crises may become more severe over a period of years, and pain is added to the early syndrome of deepening jaundice, abdominal distress, fever, malaise, and headache until the pain becomes the prominent symptom and the attacks are quite typical of cholelithiasis. The values for urobilin and urobilinogen in the duodenal contents are quite constantly high. This value is constantly decreased after splenectomy. Preoperative transfusions were not necessary in any of the cases of this series. Immediate postoperative improvement was very striking. The jaundice frequently becomes noticeably improved within twenty-four hours and may entirely disappear during the first few days. There was one operative death. The reports in all save two of the other patients were good. The disease in the two patients who have not done so well was of the acquired type. One died four months after splenectomy. The other improved rapidly and was in excellent health after 1½ years. She then had a relapse of both the anemia and jaundice, but improved satisfactorily after two transfusions and is now in good health. The remaining eight patients have been well for twenty-three months or less.

Hemolytic jaundice may be regarded as the diagnostic keystone of the diseases associated with splenomegaly and anemia. In clinical significance it occupies the center of a group of diseases with cirrhosis of the liver, syphilis of the liver with splenomegaly, and obstructive forms of chronic jaundice, on the one hand, and pernicious anemia, splenic anemia, leukemia, and splenic Hodgkin's disease on the other. An appreciation of the characteristics of hemolytic jaundice gives a new insight into the diagnosis of these interesting diseases. The differentiation between chronic jaundice due to obstruction of larger ducts and hemolytic jaundice (which in part may be due to obstruction of smaller ducts) depends largely on a recognition of the type of jaundice present. The jaundice of uncomplicated hemolytic jaundice is an intensified "hemolytic" icterus, an exaggerated form of the icteroid tinge so constantly seen in pernicious anemia. It is an acholuric jaundice; there is no bile in the urine. It is not associated with pruritus. It is of a chronic nature and may be comparatively deep or of mild grade. It is usually remittent in type and never entirely disappears. In obstructive jaundice there is cholic urine and frequently acholic stool; in hemolytic jaundice, acholic urine and cholic stool. The second more important distinction between obstructive jaundice and hemolytic jaundice lies in the difference in the resistance of the erythrocytes in the peripheral circulation to hypotonic salt solution. In obstructive jaundice the resistance of the red cells is quite constantly increased—sometimes very markedly increased—while in hemolytic jaundice it is decreased; that is, the cells are more fragile. This has been found to be a congenital condition, and members of the family should be tested for fragile corpuscles in order to ascertain exact data concerning the congenital factor in a larger percentage of the cases. An increase of fragility in other members of the family may prove to be corroborative evidence to a diagnosis.

Certain types ot cirrhosis of the liver with jaundice may prove to be impossible

of a clinical classification. While the spleen is usually smaller in cirrhosis of the liver than in hemolytic jaundice, and the resistance of the red cells is increased, both of these criteria may be vitiated; that is, the spleen may be quite large and the presence of toxic substances and bile pigments may affect the resistance of the red cells. The author has seen so confused a condition in the same patient as cirrhosis of the liver, marked splenomegaly, cholelithiasis, and a pernicious anemia type of blood picture, where only a definitely increased fragility of the red cells indicated the way to a diagnosis of hemolytic jaundice as the probable primary condition. A more baffling confusion may exist when hemolytic jaundice has progressed through its attacks of acholuric crises to typical attacks of cholelithiasis with a secondary obstructive jaundice superimposed upon the original hemolytic jaundice. In this event, the Ribierre test for an increased fragility of the erythrocytes, if positive, becomes of especial importance. Increased fragility, a history of former recurrent attacks of jaundice and crises, together with a predominating splenomegaly and a more or less severe anemia, will usually, upon careful analysis, serve to indicate the proper diagnosis.

The importance of obtaining a history of recurrent attacks of jaundice is exemplified in the mistake not uncommonly made of confusing hemolytic jaundice with simple splenic anemia. The history of every patient with suspected splenic anemia should be reviewed carefully for former attacks of jaundice and crises of the acholuric type. In this way only will patients with little or no jaundice at the time of examination be differentiated. Hemolytic jaundice is always to be considered before a diagnosis of splenic anemia is made.

Pernicious anemia may simulate hemolytic jaundice. Given a young patient with a large spleen and evidence of very active hemolysis resulting in a moderate degree of icterus, hemolytic jaundice would at once be suspected. The pernicious anemia type of blood picture with high color index occasionally occurs in hemolytic jaundice when myelotoxic features have developed, and this finding further confuses the picture. It would appear that the chief reliance in these cases must be placed upon the absence of typical history of a pernicious anemia and the finding of fragile red cells; for in pernicious anemia there is not the increased fragility which is found in hemolytic jaundice. In many cases of pernicious anemia in which the Ribierre test has been done, the resistance of the erythrocytes to hypotonic salt solution has been constantly normal or increased.

Splenic Hodgkin's disease usually remains undiagnosed until surgical exploration or autopsy. The spleen is nodular, and this characteristic may be possible of recognition upon physical examination. A history of the former enlargement of the lymph nodes may be obtained while the lymph glands may be small and the spleen large at the time of examination. In every case of splenomegaly the condition of the lymphatic system demands observation, and if necessary a gland should be excised for pathologic diagnosis. The author has recently seen two patients with Hodgkin's disease who presented very large spleens and small lymphatic glands; in one of these a diagnosis was made upon the microscopic examination of an excised gland.

VENEREAL DISEASES AND SYPHILIS AMONG THE FRENCH AND ENGLISH.

There is a somewhat breezy letter from GRAJEWSKI (*Urologic and Cutaneous Review*, August, 1917) concerning the British General Headquarters at Rouen. They have 2000 venereal cases all the time. A general officer is quoted to the effect that he has seen over 50,000 cases of syphilis since the beginning of the war. They have had a patient who had had three infections—infected, cured; infected, cured; infected. They have had many infected twice. They believe that they can cure a great many of their cases. On account of the severe cold

all of the waterworks of the hospital are at times frozen up and they are unable to distill water for salvarsan.

They are using a neosalvarsan by Dr. C. Pepin, of Paris. Two .9 gm. ampoules dissolved in 30 Cc. of distilled water make three 10-Cc. doses of .6 gm. neosalvarsan. It dissolves very rapidly with little shaking, and they speak highly of it. Grajewski watched three captains (doctors) assisted by three corporals give 120 .6 gm. intravenous injections of neosalvarsan to 120 patients in eighty minutes by the watch.

They use a powerful 30-Cc. syringe, moderately long, heavy bore, sharp platinum needle. The patient lies on a wooden bench, his right arm lies on a bench which connects the heads of the four tables in series. The soldier's muscular, big veined, right arm is encircled by an 8-inch drainage tube tourniquet. The attendent pushes the blood from the hand up into the arm and touches the spot with iodine. The surgeon punctures his vein, draws a little blood in his syringe, corporal loosens tourniquet, patient opens hand, injection is made, corporal flaps a piece of gauze over point and with same motion lifts patient to sitting position and off of foot of bench. In the meanwhile the surgeon sticks his needle into wood alcohol, flames it, refills syringe, and is ready for the next. A corporal is continually giving new bottles of prepared neosalvarsan. The writer never saw them miss a vein on the first jab. They hold their syringe loosely in their hand, flat beveled surface of the needle upward, with their left index-finger hold skin in line of vein, two inches distal to point of injection, and the thing is done.

One corporal makes the cards, another applies a little adhesive to the gauze if the puncture bleeds. The patients are up and about; they have never had a death, and very few bad reactions. They allow two full days to elapse between each of the three injections, and eleven days to elapse between each of the four series of injections. Twelve injections to each case.

The cases also get 1 grain of a mercury preparation intramuscularly every two days. The mercury preparation was new to the writer and he did not remember it. They average forty seconds to the injection.

This account runs largely to time, but this is war, the patients are practically prisoners, and three doctors are treating 500 to 800 men a day.

The gonorrheal problem is much more difficult. Eight hundred daily; three doctors at present, four usually. Irrigations are done by the patients. Many pails of permanganate are hung on a long iron rail. Two siphon tubes lead down to the glass nozzles. The patient lines up on each side of a long, wide trough with a central partition running its length. Each trough takes care of 200 men daily. They try to irrigate into the bladder. Relatively few complications occur. After two or three weeks, if the patient does not do well, they change to zinc sulphocarbolate, zinc chloride, eusol, silver nitrate, .20-per-cent argyrol, or ½-per-cent protargol instillations with an Ultzmann syringe for obstinate posterior urethritis. Lately they are employing succinamide of mercury as an irrigation.

On many occasions they suspect the men of attempting to retard their recovery. As soon as a complication arises irrigations are stopped, patient goes to bed, fomentations are applied for epididymitis and orchitis, hot sitz baths for prostatitis, etc. The pathologist makes his own vaccines, and they are used freely for complications. They have had no gonorrheal endocarditis, and a very small amount of gonorrheal rheumatism. High-frequency current is used in the subacute stages of rheumatism with satisfactory results.

Many cases hang on, suffer frequent relapses, and the doctors are not encouraged by their results. They have cured cases in twenty-one days, but as a rule feel that their results are little better than they had in private practice before the war.

Prophylaxis: It seems as if there is no well-organized method of instructing the troops about or providing them with prophylactic measures.

The men being kept in detention camp

until they pass three examinations, at intervals of five days each, in order to see if they are free of discharge, and then being kept without leave for one year, should protect England and the colonies.

Syphilitics must show a continuous negative Wassermann before discharge. The author thought they were doing poor work in regard to prophylaxis, but excellent work in regard to the cure.

REVIEWS.

THERAPEUTICS, MATERIA MEDICA AND PHARMACY. By Samuel O. L. Potter, A.M., M.D. 13th Edition, Revised and Enlarged, by Elmer H. Funk, M.D. P. Blakiston's Son & Co., Philadelphia, 1917. Price $6.00.

Potter's Materia Medica and Therapeutics needed revision because during recent years, while something had been added to it, little that could well be taken out had been removed from its pages. The choice of the publishers in choosing Dr. Funk as the editor of the new edition was a wise one, as he brings enthusiasm and clinical experience to the difficult task of revising a text which has been prepared by some one else. In order to make his work more competent he has called to his aid a number of his colleagues in the revision of different portions of the book, and he has introduced, of course, the nomenclature, and the other necessary facts for a book on therapeutics and pharmacy, from the Ninth Revision of the U. S. Pharmacopœia.

Those of our readers who are familiar with the earlier editions of this book will remember that after the preliminary material, which is appropriate to such a volume, the author takes up drugs according to their alphabetical arrangement, briefly discussing their physiological action and their therapeutic applications, and then proceeds to an alphabetical arrangement of diseases in which brief notes as to the employment of various drugs and non-medicinal measures are given, usually in a line or two. Introduced in this portion of the book, which is very considerable, there is an alphabetical arrangement of the common poisons and the method of treating their effects.

The closing pages are taken up with an appendix giving a list of contractions and Latin phrases used in writing prescriptions with the corresponding English equivalents, hypodermic formulæ, and some tables of differential diagnosis of the more common diseases.

The very last pages are taken up with tables showing various weights and measures and the law and regulations relating to the production, importation, manufacture, etc., of narcotic drugs as prescribed under the so-called Harrison Act.

The practitioner will be able to get a good many hints from the contents of this volume which will prove useful to him in practice, and so may the student of medicine.

Familiar as we are with the earlier editions of this book, we have looked with interest for the additions and corrections which the editor has made. They are wise and appropriate. We wish that he had gone a step further and revised more thoroughly some of the statements in the original text, which we believe should be modified if they are really to represent modern therapeutic beliefs. For example, we doubt whether the statement is true that "quinine reduces the size of the spleen when enlarged, and lowers the temperature of pyrexia by lessening oxidation." While these statements may be true in a sense, it scarcely gives the student a correct conception of the action of this drug along these lines. So, too, we do not believe that the editor is responsible for the statement that ethyl chloride is increasing in popularity as a general anesthetic, as we believe its greatest popularity existed some years ago.

Without doubt, the book, having been revised so thoroughly, will once more renew its popularity, and we believe that when Dr. Funk revises the next edition he will be

still more thorough in striking out some statements and supplanting them with others so that we will have the advantage of his opinions, rather than those of the author, who has now been dead for some time, and some of whose early views still persist in the text.

As intimated at the beginning of this review, there is probably no task more difficult than the revision of a text-book written by some one else. There is natural hesitancy on the part of the reviser to deal disrespectfully with the opinions of the author, and oftentimes it is most difficult to determine whether facts are of sufficient importance to justify their retention or whether they should be more or less brutally excluded. In the face of these difficulties Dr. Funk has cleverly completed his task and greatly improved a book which has always possessed value.

SANITATION FOR MEDICAL OFFICERS. By Edward B. Vedder, M.D. Medical War Manual No. 1. Illustrated. Lea & Febiger, Philadelphia, 1917.

This is the first of a series of medical war manuals authorized by the Secretary of War, and under the supervision of the Surgeon-General of the Army and the Council of National Defense. Dr. Vedder is a Lieutenant-Colonel in the Medical Corps of the U. S. Army, and is already favorably known for contributions which he has made in fields closely connected with the service.

The series is printed on very thin paper, which, nevertheless, is tough enough to stand hard usage, and appears in such shape that it can be readily carried in the breast pocket of the khaki uniform, being about three-eighths of an inch thick, although the book contains 206 pages of text and a considerable number of blank pages upon which the medical officer may make such notes as he deems wise.

In the present issue, which is not supposed to contain anything novel, but a brief summarization of what reserve medical officers should know, there are five chapters, the first dealing with sanitation of the camp; the second, sanitation of the march; the third with sanitation of the trenches and battlefield; the fourth with insects concerned in the transmission of disease; the fifth, notes on transmissible diseases. In the last two chapters a large amount of information is given which might readily be included in a small book on the practice of medicine in that the etiology, period of incubation, prophylaxis, and diagnosis of transmissible diseases is discussed.

We shall look forward to the appearance of subsequent volumes in this series with a good deal of interest. They will undoubtedly provide reserve officers with much valuable information.

THE PRESCRIPTION. Therapeutically, Pharmaceutically, Grammatically, and Historically Considered. By Otto A. Wall, PhG., M.D. 4th Revised Edition. The C. V. Mosby Co., St. Louis, 1917.

The author devotes 268 pages to the consideration of the prescription along the lines indicated in the title just given. As Professor of Materia Medica, Pharmacognosy, and Botany in the St. Louis College of Pharmacy he is familiar with the mistakes and errors into which the dispensing physician often falls, and his design in the compilation of his text has been to meet the needs of the pharmacist in deciphering and compounding prescriptions and the necessities of the physician in writing them.

An interesting part of the volume is that which is devoted to the history of the prescription from the earliest times and including the survival of early superstitious practices.

FOOD FOR THE SICK. A Manual for Physician and Patient. By Solomon Strouse, M.D., and Maude A. Perry, A.B. W. B. Saunders Company, Philadelphia, 1917. Price $1.50.

This is a very useful little manual designed for the use of physicians and nurses in the dietetic management of their cases. After a brief preliminary chapter upon food and its uses, including the standard tables as to the relative proportion of protein, fat, carbohydrate, etc., in various foodstuffs, with interesting statements as

to the number of calories needed by human beings at various ages, it proceeds to a description of menus for normal individuals, and then takes up the dietetic management of diabetes mellitus, giving details in regard to the so-called Allen method of treatment. Possibly one of the best things in the book, from the standpoint of the physician, is the table on page 49 which gives the percentages of carbohydrate in various commonly employed foodstuffs. Quotations are also made from Joslin as to the means by which we should test the ability of the patient to utilize starches without the elimination of sugar, and also his ability to utilize proteins and fats. A very large part of the book is devoted to this important subject of diet in diabetes. This is followed by a chapter upon diet in gout, and other pages devoted to diet in diseases of the kidneys, in diseases of the stomach, and in diseases or disorders of the intestines and liver. The closing pages of the book are devoted to food in pulmonary conditions, including tuberculosis, and in diseases of the skin, with a consideration of feeding in fevers. Last of all, various diets which have been recommended by numerous authorities in the treatment of obesity are given.

From time to time within the last year or two we have had occasion to call attention to books dealing with dietetics. Several of them have been designed to go into the matter most exhaustively and scientifically. This one is essentially practical, and the physician can obtain from it definite information with ease.

NOTES AND QUERIES.

CURRENT EPIDEMICS IN THE CENTRAL EMPIRES.

The *Lancet* of September 22, 1917, points out that medical science during the present war has succeeded in preventing the occurrence among the military of certain epidemic diseases which in former campaigns have ravaged the forces in the field. But among the civil population of the Central Empires and among the unfortunate inhabitants of the occupied territories it is otherwise. At the present time smallpox, typhus, and dysentery are very prevalent, and relapsing fever is threatening to add itself to the list. For more than two years smallpox has been epidemic in Austria, and more particularly in the provinces of Galicia and Bukowina. Not far short of 50,000 smallpox cases have been reported in Austria during 1915-16, more than 42,000 of the attacks occurring in these two provinces, whence the infection was carried to some of the larger cities, including Vienna, Prague, and Budapest. In Vienna during the twelve months immediately following the outbreak of war over 1600 cases were reported. As vaccination is not obligatory in the civil population of Austria many persons are unprotected against smallpox infection. In Poland the disease is visiting Warsaw, among other places.

Germany is regarded as being the best prepared of all European countries to resist attack by smallpox; but the disease has been epidemic in North Germany during the first seven months of 1917, 2400 cases having been notified to the authorities, the largest number yet recorded in Germany since notification was begun. The prevalence being in December, 1916, at Hamburg, where Russian prisoners were being employed as dock laborers and by whom probably the infection was introduced. In addition to the prisoners of war large numbers of the people of the occupied districts of Belgium, Northern France, Poland, and other Russian provinces have been deported from their homes and compelled to work in North Germany in the fields or in the mines and factories or in other industries. These wretched slaves, coming from countries in which vaccination is not compulsory, are in many instances unprotected

against smallpox, and form susceptible material on which an epidemic could easily develop. Their susceptibility to infection is not likely to have been diminished by the overcrowding, underfeeding, and the overworking to which they have been subjected, nor by the depression of spirits from which they have suffered during their bondage. From Hamburg smallpox spread in the early months of 1917 to other districts in North Germany, affecting also some of the large towns, including Berlin, Munich, Leipzig, Potsdam, Essen, Bremen, Altona, Kiel, and Lübeck. Smallpox is in Europe generally a disease of the winter and spring months, so that while there has been in August some diminution in the number of cases reported weekly, it is very probable that with the advent of winter we may see a recrudescence of the epidemic in Germany.

Typhus is endemic in the Austrian province of Galicia, but since the outbreak of war it is probable that typhus infection has been brought into the Austrian war zones by prisoners from Russia and Serbia. It is well known that the wretched Serbian prisoners interned in Austria since the war have died in thousands from typhus in the concentration camps. Among the Austrian civilian population more than 13,000 typhus cases occurred during 1915, and over 12,000 in 1916. During the first three months of 1917 about 3000 fresh cases were notified, most of them in Galicia. In Hungary, typhus is now prevalent, and in the first half of 1917 some 2500 cases were reported. In Bosnia and Herzegovina typhus has also been rife during the whole period of the war. In Poland, now occupied by German troops, there is at the present time a very severe epidemic of typhus going on, especially in the city of Warsaw and in the adjoining districts. During the last twelve months nearly 16,000 cases have been reported, of which more than 8500 occurred in Warsaw. Typhus has been appearing in Germany since 1914, chiefly among the prisoners of war who, crowded together in large numbers in camps, with little means afforded them of maintaining personal cleanliness or opportunities for changing their clothes and keeping themselves free from body vermin, soon develop typhus of a virulent kind, probably infected in the first instance by Russians.

Dysentery is epidemic in Germany, and especially in Prussia, where in the first seven months of 1917 about 13,000 cases were notified among the civil population, more than 6000 attacks being reported during the last fortnight. The chief places at present affected are Berlin, Potsdam, Strasburg, Frankfort, Munich, Mannheim, and the industrial districts of Rhenish Westphalia. In Austria, too, dysentery is epidemic, and from February to July, 1917, more than 4000 cases were officially recorded. A Vienna newspaper recently stated that "cholera itself could not be worse than the dysentery epidemic now raging." This paper also asserted that the disease had been brought to Vienna by soldiers from the front. There is suggestion that these prevalences of dysentery in Germany and Austria are associated with malnutrition, arising partly from improper or insufficient diet and the use of the so-called "food substitutes." There is a great scarcity of milk, and dysenteric patients are often unable to obtain this essential article of their diet. When obtainable the fatty matter has already been abstracted from the milk by order of the government for use in munition works. There appears to be a possibility that before long relapsing, or famine, fever will be added to the epidemic diseases current in the Central Empires. Already cases are being reported weekly in some districts of Germany, and Mannheim is especially mentioned as one of the worse sufferers. In Poland relapsing fever is also occurring, and cases in increasing numbers are being reported week by week, especially in the towns of Warsaw, Lodz, and Plock, where the Poles are experiencing great privations and where the various epidemics have been adversely affected by the absence of medical men.